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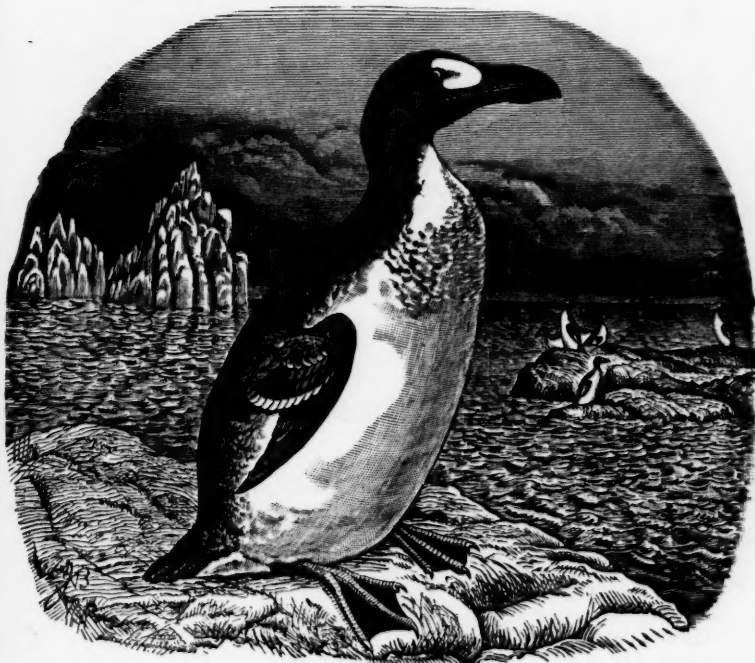
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PALMÉN, Dr. J. A., Helsingfors, Finland.....	1883
PYCRAFT, W. P., British Museum (Nat. Hist.), Cromwell Road, London, S. W.....	1902
RAMSEY, E. P., Sydney, New South Wales.....	1884
RINGER, FREDERIC, Nagasaki.....	1888
ROTHSCHILD, Hon. WALTER L., Zoölogical Museum, Tring, England.....	1898
SCHALOW, HERMAN, 15 Schleswiger Ufer, Berlin, N. W.....	1884
SHELLEY, Capt. G. E., 39 Edgerton Gardens, South Kensington, London, S. W.....	1884
SUCSHKIN, Dr. PETER, Imperial University, Moscow.....	1903
THEEL, Dr. HJALMAR, University of Upsala, Upsala, Sweden.....	1884
TSCHUSI ZU SCHMIDHOFFEN, VICTOR RITTER VON, Villa Tännenhof, bei Hallein, Salzburg, Austria.....	1884
WATERHOUSE, F. H., 3 Hanover Square, London, W.....	1889
WINGE, Dr. HERLUF, Copenhagen.....	1903
WORCESTER, Prof. DEAN C., Manila, P. I.....	1903
ZELEDON, Don JOSÉ C., San José, Costa Rica.....	1884

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THAYER, ABBOTT H., Monadnock, N. H.	1901
THAYER, JOHN ELIOT, Lancaster, Mass.	1905
TODD, W. E. CLYDE, Carnegie Museum, Pittsburgh, Pa.	1901
TORREY, BRADFORD, Newton Lower Falls, Mass.	1901
TOWNSEND, CHARLES H., Aquarium, Battery Park, New York City.	1901
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ARNOW, ISAAC F., St. Marys, Ga.	1903
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BRADFORD, MOSES B. L., Concord Public Library, Concord, Mass.	1889
BRADLEE, THOMAS STEVENSON, Somerset Club, Boston, Mass.	1902
BRANDRETH, COURTENAY, Cliff Cottage, Ossining, N. Y.	1905
BRANDRETH, FRANKLIN, Cliff Cottage, Ossining, N. Y.	1889
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BROOKS, ALLAN, Okanagan Landing, B. C.	1902
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BROWN, HUBERT H., 100 Gothic Ave., Toronto Junction, Ontario.	1889
BROWN, LEWIS BOYER, 29 Admiral Road, Toronto, Ontario.	1904
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BROWNSON, W. H., Superintendent of Schools, Portland, Me.	1903
BRYANT, OWEN, Cohasset, Mass.	1903
BUCK, HENRY ROBINSON, Box 213, Hartford, Conn.	1897
BUFFUM, M. C., 28 Greenough Place, Newport, R. I.	1905
BUMPUS, Dr. HERMON C., Am. Mus. Natural History, New York City.	1901
BURGESS, JOHN KINGSBURY, Chestnut St., Dedham, Mass.	1898
BURKE, Wm. BARDWELL, 130 Spring St., Rochester, N. Y.	1901
BURNETT, WILLIAM L., 128 N. Sherwood St., Fort Collins, Colo.	1895
BURNEY, THOMAS L., 83 New Park St., Lynn, Mass.	1905
BURTCH, VERDI, Branchport, N. Y.	1903
BURTIS, HENRY MOTT, Babylon, N. Y.	1897
BUTLER, Miss CHARLOTTE W., 75 Cabot St., Beverly, Mass.	1904

BUXBAUM, MRS. CLARA E., St. Joseph, Mich.	1895
CABOT, LOUIS, Brookline, Mass.	1904
CADY, MRS. JOHN H., 127 Power St., Providence, R. I.	1905
CALLENDER, JAMES PHILLIPS, 603 Springfield Ave., Summit, N. J.	1903
CAMERON, E. S., V. Ranch, Terry, Montana.	1903
CAMPBELL, MRS. ROBERT, 280 Wildwood Ave., Jackson, Mich.	1905
CARLETON, CYRUS, 69 Vinton St., Providence, R. I.	1903
CARPENTER, REV. CHARLES KNAPP, Polo, Ill.	1894
CARR, RUFUS H., 160 Pearl St., Brockton, Mass.	1904
CARROLL, J. M., 714 Speight St., Waco, Tex.	1905
CASE, REV. BERT F., Middle Haddam, Conn.	1903
CASE, CLIFFORD M., 100 Ashley St., Hartford, Conn.	1892
CASH, HARRY A., 166 S. Angell St., Providence, R. I.	1898
CATLIN, JAMES P., Ottawa, Ill.	1905
CHAMBERLAIN, CHAUNCEY W., 36 Lincoln St., Boston, Mass.	1885
CHAPIN, Prof. ANGIE CLARA, 25 Freeman Cottage, Wellesley, Mass.	1896
CHAPMAN, Dr. E. A., 107 E. 23rd St., New York City	1905
CHASE, MRS. AGNES, 116 Florida Ave., N. W., Washington, D. C.	1896
CHASE, SIDNEY, Nantucket, Mass.	1904
CHILDS, JOHN LEWIS, Floral Park, N. Y.	1900
CHRISTY, BAYARD H., 403 Frederick Ave., Sewickley, Pa.	1901
CHUBB, SAMUEL H., Amer. Mus. Nat. Hist., New York City	1894
CLAPP, Miss Martha G. B., 163 East St., Pittsfield, Mass.	1903
CLARK, EDWARD B., 341 Oak St., Chicago, Ill.	1900
CLARK, Miss EMILY L., 103 Main St., St. Johnsbury, Vt.	1905
CLARK, JOSIAH H., 238 Broadway, Paterson, N. J.	1895
CLARK, Miss SUSAN E., 103 Main St., St. Johnsbury, Vt.	1905
CLARKE, Dr. CHARLES K., Toronto Asylum, Toronto, Ont.	1902
CLARKE, Miss HARRIET E., 9 Chestnut St., Worcester, Mass.	1896
CLEVELAND, Dr. CLEMENT, 59 W. 38th St., New York City	1903
COALE, HENRY K., Highland Park, Ill.	1883
COFFIN, Miss LUCY V. BAXTER, 3232 Groveland Ave., Chicago, Ill.	1905
COGGINS, HERBERT LEONARD, 5025 McKean Ave., Germantown, Philadelphia, Pa.	1898
COLBURN, ALBERT E., 1204 S. Main St., Los Angeles, Cal.	1891
COLSON, HAROLD ROY, 15 Walker St., Cambridge, Mass.	1904
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CROLIUS, MISS ANNE A., 815 Carnegie Hall, New York City.	1897
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DUGMORE, ARTHUR RADCLYFFE, Newfoundland, N. J.	1899
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DYKE, Prof. L. L., Lawrence, Kansas.	1886
DYKE, ARTHUR CURTIS, Bridgewater, Mass.	1902
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ELLS, GEORGE P., Norwalk, Conn.	1904
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GIBSON, LANGDON, 18 Washington Ave., Schenectady, N. Y.....	1904
GIFFORD, EDWARD WINSLOW, Acad. of Sciences, San Francisco, Cal.....	1904
GLEASON, Rev. HERBERT W., 83 Pinckney St., Boston, Mass.....	1894
GODDARD, F. N., 33 E. 50th St., New York City.....	1901
GOODALE, Dr. JOSEPH LINCOLN, 397 Beacon St., Boston, Mass.....	1885
GOODRICH, JULIET T., 10 Astor St., Chicago, Ill.....	1904
GOODWIN, Miss AMELIA M., 10 Follen St., Cambridge, Mass.....	1904
GOSS, Mrs. ALETTA W., 5475 Ridgewood Court, Chicago, Ill.....	1902
GOULD, JOSEPH E., Norfolk & Southern Railway Co., Berkley, Va.....	1889
GRANGER, Miss HELEN, Pierce Hall, Cambridge, Mass.....	1904
GRANGER, WALTER W., Am. Mus. Nat. Hist., New York City.....	1891
GRAVES, Mrs. CHARLES B., 66 Franklin St., New London, Conn.....	1905
GREENE, EARLE R., 470 Jackson St., Atlanta, Ga.....	1905
GREENOUGH, Mrs. AMELIA P., 377 Beacon St., Boston, Mass.....	1904
GREENOUGH, HENRY VOSE, 45 Carlton St., Brookline, Mass.....	1901
GRIFFING, MOSES BOWDITCH, Shelter Island Heights, N. Y.....	1897
GRIFFITHS, BARTRAM W., 4024 Green St., Philadelphia, Pa.....	1902
HALES, HENRY, Ridgewood, N. J.....	1890
HALL, H. PORTER, Leominster, Mass.....	1904
HAMFELDT, A., The Ware Times, Ware, Ia.....	1892
HAMILTON, CAMPBELL T., 216 77th St., Brooklyn, N. Y.....	1905
HAMLIN, GEORGE L., R. F. D. 9, Fairfield, Conn.....	1893
HANKINSON, THOMAS LEROY, Charleston, Ill.....	1897
HANN, HERBERT H., 700 Springfield Ave., Summit, N. J.....	1903
HARDON, Mrs. HENRY W., 315 West 71st St., New York City.....	1905

HARDY, JOHN H., Jr., 24 Irving St., Arlington, Mass.	1905
HARRIMAN, Miss CORNELIA, Arden, New York City	1899
HARRIMAN, Miss MARY, 1 E. 55th St., New York City	1899
HARTLEY, INNESS, 314 W. 86th St., New York City	1901
HARVEY, Miss RUTH SAWYER, Bond Hill, Cincinnati, Ohio	1902
HASKELL, Miss HELEN P., 1207 Henry St., Alton, Ill.	1905
HATHAWAY, HARRY S., Box 498, Providence, R. I.	1897
HAVEMEYER, H. O., Jr., Mahwah, N. J.	1893
HAZARD, Hon. R. G., Peace Dale, R. I.	1885
HEAD, Miss ANNA, 2538 Channing Way, Berkeley, Cal.	1903
HEERMANCE, EDGAR THORNTON, 364 Palisade Ave., Yonkers, N. Y.	1903
HELME, ARTHUR H., Miller Place, N. Y.	1888
HEMPHILL, ASHTON E., Holyoke, Mass.	1905
HENDERSON, Judge JUNIUS, Boulder, Colo.	1903
HENDRICKSON, W. F., 130 12th St., Long Island City, N. Y.	1885
HENNINGER, Rev. WALTHER F., 206 Jefferson St., Tiffin, Ohio	1898
HERRICK, HAROLD, 46 Cedar St., New York City	1905
HIGBEE, HARRY G., 13 Austin St., Hyde Park, Mass.	1900
HILL, A. C., 400 Pleasant St., Belmont, Mass.	1905
HILL, ELIZABETH, Sewall, Groton, Mass.	1904
HILL, JAMES HAYNES, Box 485, New London, Conn.	1897
HILL, Mrs. THOMAS R., 4613 Wayne Ave., Germantown, Pa.	1903
HINDSHAW, HENRY HAVELOCK, N. Y. State Museum, Albany, N. Y.	1897
HINE, Prof. JAMES STEWART, Ohio State Univ., Columbus, Ohio	1899
HINE, Mrs. JANE L., Sedan, Ind.	1890
HINTON, Miss SUSAN McV., 41 W. 32d St., New York City	1900
HITCHCOCK, FRANK H., 658 Chestnut St., Waban, Mass.	1891
HIX, GEORGE E., 630 Columbus Ave., New York City	1904
HODGE, Prof. CLIFTON FREMONT, Clark Univ., Worcester, Mass.	1899
HOLBROOK, Miss ISABEL B., Rhode Island Normal School, Providence, R. I.	1905
HOLDEN, Mrs. EMELINE R., 13 E. 79th St., New York City	1902
HOLDEN, Mrs. EDWIN B., 323 Riverside Drive, New York City	1903
HOLLAND, Dr. WILLIAM J., 5th and Bellefield Aves., Pittsburgh, Pa.	1899
HOLLISTER, NED, Biological Survey Dept. of Agriculture, Washington, D. C.	1894
HOLLISTER, WARREN D., Continental Oil Co., Denver, Colo.	1901
HOOKE, Mrs. CHARLES PARKER, 67 Chestnut St., Springfield, Mass.	1903
HORSFALL, BRUCE, 38 Moore St., Princeton, N. J.	1905
HORSHERT, HERMAN, 3851a Juniata St., St. Louis, Mo.	1904
HOWARD, J. STANLEY, Box 52, Silver Lake Assembly, N. Y.	1904
HOWARD, OZORA WILLIAM, Box 1177 Los Angeles, Cal.	1898
HOWE, CARLTON D., Essex Junction, Vt.	1901
HOWE, REGINALD HEBER, Jr., Longwood, Brookline, Mass.	1895
HOWLAND, RANDOLPH H., 130 Grove St., Montclair, N. J.	1903
HUBBARD, Mrs. SARA A., 177 Woodruff Ave., Brooklyn, N. Y.	1891

HUBEL, FREDERICK C., 112 Alexandrine Ave., W., Detroit, Mich. . . .	1903
HUNN, JOHN T. SHARPLESS, 1218 Prospect Ave., Plainfield, N. J. . . .	1895
HUNT, CHRESWELL J., 1306 N. 53rd St., West Philadelphia, Pa. . . .	1902
HUNTER, W. D., Box 208, Dallas, Texas	1899
INGALLS, CHARLES E., East Templeton, Mass.	1885
INGERSOLL, ALBERT M., 818 5th St., San Diego, Cal.	1885
IRVING, JOHN, 550 Park Av., New York City	1894
ISHAM, C. B., 30 E. 63d St., New York City	1891
JACKSON, THOMAS H., 343 E. Biddle St., West Chester, Pa.	1888
JAGER, H. J., 222 State Ave., Owatonna, Minn.	1904
JANNEY, NATHANIEL E., 112 Drexel Bldg., Philadelphia, Pa.	1899
JENKINS, HUBERT OLIVER, Stanford University, Cal.	1902
JENNEY, CHARLES F., 35 Congress St., Boston, Mass.	1905
JOHNSON, EVERETT EDWIN, R. F. D. 1, Box 46, Hebron, Me.	1896
JOHNSON, FRANK EDGAR, 16 Amackassin Terrace, Yonkers, N. Y. . . .	1888
JOHNSON, JAMES HOWARD, Bradford, N. H.	1894
JOHNSON, WALTER ADAMS, 133 E. 16th St., New York City	1898
JOHNSON, WILLIAM S., Boonville, N. Y.	1893
JORDAN, A. H. B., Everett, Wash.	1888
JUDD, ELMER T., Cando, N. D.	1895
KAY, JOHN WILBUR, 62 Selden Ave., Detroit, Mich.	1904
KAY, WALLACE G., 62 Selden Ave., Detroit, Mich.	1904
KEAYS, JAMES EDWARD, 328 St. George St., London, Ontario	1899
KEIM, THOMAS DANIEL, 405 Radcliffe St., Bristol, Pa.	1902
KELKER, WILLIAM A., Box 114, Harrisburg, Pa.	1896
KELLOGG, Prof. VERNON L., Stanford University, Cal.	1888
KENDALL, Miss BLANCHE, 20 Dudley St., Brookline, Mass.	1904
KENDALL, Dr. WILLIAM C., U. S. Bureau of Fisheries, Washington, D. C.	1886
KENNARD, FREDERIC HEDGE, Brookline, Mass.	1892
KENT, GEORGE H., Suffolk, Miss.	1905
KERMODE, FRANCIS, Curator Provincial Museum, Victoria, B. C. . .	1904
KEYES, Prof. CHAS. R., Mt. Vernon, Ia.	1904
KEYSER, Rev. LEANDER S., 108 W. Third St., Canal Dover, Ohio. . .	1891
KING, GEORGE GORDON, 16 E. 84 St., New York City	1888
KING, LE ROY, 20 E. 84th St., New York City	1901
KIRKHAM, Mrs. JAMES W., 275 Maple St., Springfield, Mass.	1904
KIRKWOOD, FRANK C., Ocean City, Md.	1892
KLUGH, A. B., Wellington Field Nat. Club, Guelph, Ont.	1904
KNAPP, Mrs. HENRY A., 301 Quincy Ave., Scranton, Pa.	1905
KNETSCH, ROBERT, Fort Worth, Tex.	1898
KNIGHT, ORA WILLIS, 84 Forest Ave., Bangor, Me.	1893
KNOLHOFF, FERDINAND WILLIAM, 28 Winans St., East Orange, N. J. .	1897
KOCH, Prof. AUGUST, Williamsport, Pa.	1891
KOPMAN, HENRY HAZLITT, Ellisville, Miss.	1899
KUTCHEN, Dr. VICTOR, Dartford, Wis.	1905

LACEY, HOWARD GEORGE, Kerrville, Texas.....	1899
LANGE, D., Central High School, St. Paul, Minn.....	1904
LANTZ, Prof. DAVID ERNEST, Dept. of Agriculture, Washington, D. C.....	1885
LARKIN, HARRY H., 237 North St., Buffalo, N. Y.....	1903
LARRABEE, AUSTIN P., 232 W. First North St., Salt Lake City, Utah.....	1902
LATIMER, Miss CAROLINE P., 19 Pierpont St., Brooklyn, N. Y.....	1898
LAURENT, PHILIP, 31 E. Mt. Airy Ave., Mt. Airy, Philadelphia, Pa.....	1902
LECHASSEUR, A., Trois-Pistoles, Quebec.....	1905
LEE, Prof. LESLIE ALEXANDER, 3 Bath St., Brunswick, Me.....	1903
LEGGE, LOUIS E., 22 Dow St., Portland, Me.....	1905
LEUTLOFF, HERMAN C. A., 666 E. 135th St., New York City.....	1896
LEVERING, THOMAS HENRY, 1627 Newton St., Washington, D. C.....	1898
LEVERSON, Dr. MONTAGUE R., Miller's Hotel, 39 W. 26th St., New York City.....	1901
LIBBY, ORIN GRANT, Grand Forks, N. Dakota.....	1900
LINCOLN, ALBERT L., Walnut Place, Brookline, Mass.....	1904
LINTON, Miss MARY J., 163 East St., Pittsfield, Mass.....	1903
LIVERMORE, JOHN R., Forest View Farm, Katonah, N. Y.....	1904
LLOYD, ANDREW JAMES, 334 Bay State Road, Boston, Mass.....	1900
LOOMIS, JOHN A., Mereta, Texas.....	1887
LORD, Rev. WILLIAM R., Rockland, Mass.....	1901
LORING, J. ALDEN, Owego, New York.....	1889
LOWE, WILLOUGHBY P., Okehampton, Devon, England.....	1893
LUM, EDWARD H., Chatham, N. J.....	1904
LYMAN, Miss EMILY R., 121 N. 18th St., Philadelphia, Pa.....	1903
MACDOUGALL, GEORGE R., 131 W. 73rd St., New York City.....	1890
MACLAY, MARK W., Jr., 13 W. 31st St., New York City.....	1905
MADDOCK, Miss EMELINE, The Belgravia, Philadelphia, Pa.....	1897
MAHER, J. E., Windsor Locks, Conn.....	1902
MAITLAND, ROBERT L., 45 Broadway, New York City.....	1889
MANN, JAMES R., Arlington Heights, Mass.....	1903
MARCH, Prof. JOHN LEWIS, Union College, Schenectady, N. Y.....	1903
MARRS, Mrs. KINGSMILL, Prouts Neck, Me.....	1903
MARSDEN, H. W., Witch Creek, Cal.....	1904
MARSH, DANIEL J., Five cent Saving Bank, Springfield, Mass.....	1894
MARTIN, Miss MARIA ROSS, Box 365, New Brunswick, N. J.....	1902
MASTERMAN, ELMER ELLSWORTH, R. F. D. 2 New London, Ohio.....	1895
MCATEE, WALDO LEE, Dept. of Agriculture, Washington, D. C.....	1903
MCCLINTOCK, NORMAN, Amberson Ave., Pittsburgh, Pa.....	1900
MCCONNELL, HARRY B., Box 77, Cadiz, O.....	1904
MCCOOK, PHILIP JAMES, 15 William St., New York City.....	1895
McELHONE, Miss NELL K., 377 West End Ave., New York City.....	1905
McEWEN, DANIEL C., 160 Stirling Pl., Brooklyn, N. Y.....	1901
McHATTON, Dr. HENRY, Macon, Ga.....	1898
McILHENNY, EDWARD AVERY, Avery Island, La.....	1894
McKECHNIE, FREDERICK BRIDGHAM, Ponkapog, Mass.....	1900

McLAIN, ROBERT BAIRD, Market and 12th Sts., Wheeling, W. Va.	1893
McMILLAN, MRS. GILBERT, Gorham, N. H.	1902
McNEIL, Miss EMILY, Cromwell Hall, Cromwell, Conn.	1905
McNULTY, HENRY A., 281 Fourth Ave., N. Y. City	1900
MEAD, MRS. E. M., 2465 Broadway, New York City	1904
MEEKER, JESSE C. A., Box 163 Danbury, Conn.	1899
MERRIAM, HENRY F., 94 New England Ave., Summit, N. J.	1905
MERRILL, HARRY, Bangor, Maine	1883
MERSHON, W. B., Saginaw, Mich.	1905
MILLER, JAMES HENRY, Lowville, N. Y.	1904
MILLER, WALDRON DE WITT, 309 E. 7th St., Plainfield, N. J.	1896
MILLS, HARRY C., Box 218, Unionville, Conn.	1897
MILLS, Prof. WILLIAM C., Ohio State Univ., Columbus, O.	1900
MITCHELL, MRS. MINA BAKER, Care of Plow Co., Chattanooga, Tenn.	1898
MITCHELL, Dr. WALTON I., 202 Levy Bldg., Galveston, Tex.	1893
MONTGOMERY, THOMAS H., Jr., Univ. of Texas, Austin, Texas	1899
MOORE, Miss ELIZ. PUTNAM, 70 West 11th St., New York City	1905
MOORE, ROBERT THOMAS, W. Main St., Haddonfield, N. J.	1898
MORCOM, G. FREAN, 726 Lake St., Los Angeles, Cal.	1886
MORGAN, ALBERT, 125 Trumbull St., Hartford, Conn.	1903
MORTON, Dr. HOWARD McILVAIN, 400 Andrus Bldg., Minneapolis, Minn.	1900
MOSHER, FRANKLIN H., Wakefield, Mass.	1905
MOSLE, MRS. GEORGE R., 301 West End Ave., New York City	1904
MUMMERY, EDWARD G., 24 E. Atwater St., Detroit, Mich.	1902
MUNRO, JAMES A., 26 Wellington St., W., Toronto, Ont.	1904
MURPHY, Dr. EUGENE E., 444 Tellfair St., Augusta, Ga.	1903
MURPHY, ROBERT C., Mt. Sinai, Long Island, N. Y.	1905
MYERS, Miss LUCY F., "Brookside," Poughkeepsie, N. Y.	1898
NASH, HERMAN W., Box 264, Pueblo, Colo.	1892
NELSON, JAMES ALLEN, 317 E. Buffalo St., Ithaca, N. Y.	1898
NEWMAN, Rev. STEPHEN M., 1818 M. St., N. W., Washington, D. C.	1898
NICHOLS, JOHN M., 46 Spruce St., Portland, Me.	1890
NICHOLS, JOHN TREADWELL, 42 W. 11th St., New York City	1901
NOLTE, Rev. FELIX, St. Benedict's College, Atchison, Kan.	1903
NORRIS, J. PARKER, Jr., 723 Walnut St., Philadelphia, Pa.	1904
NORRIS, ROY C., 725 N. 10th St., Richmond, Ind.	1904
NOWELL, JOHN ROWLAND, Box 979, Schenectady, N. Y.	1897
NOYES, MRS. HARRY A., Hyde Park, Vt.	1905
O'CONNOR, HALDEMAN, 25 N. Front St., Harrisburg, Pa.	1886
OGDEN, Dr. HENRY VINING, 141 Wisconsin St., Milwaukee, Wis.	1897
OLDYS, HENRY, Dept. of Agriculture, Washington, D. C.	1896
OLIVER, DANIEL LEET, 701 Ridge Ave., Allegheny, Pa.	1902
OLIVER, Dr. HENRY KEMBLE, 2 Newbury St., Boston, Mass.	1900
ORMSBEE, Miss CARRIE W., Brandon, Vt.	1904
OSGOOD, HENRY W., Pittsfield, N. H.	1901

OSGYANI, A., 367 Union Ave., Bridgeport, Conn.	1904
OWEN, Miss JULIETTE AMELIA, 306 N. 9th St., St. Joseph, Mo.	1897
PADDOCK, Miss ISABEL M., Fairbank's Museum, St. Johnsbury, Vt.	1904
PAINE, AUGUSTUS G., Jr., 126 E. 39th St., New York City	1886
PALMER, SAMUEL COPELAND, Swarthmore, Pa.	1899
PARKE, LOUIS T., 4039 Spruce St., Philadelphia, Pa.	1903
PARKER, Hon. HERBERT, S. Lancaster, Mass.	1904
PATTEN, Mrs. JOHN D. H., 2212 R St., N. W., Washington, D. C.	1900
PEABODY, Rev. P. B., Blue Rapids, Kans.	1903
PEAVEY, ROBERT W., 791 Coney Island Ave., Brooklyn, N. Y.	1903
PECK, CLARK J., 6728 Leeds St., W. Philadelphia, Pa.	1904
PECK, HENRY O., 62 Pomeroy Ave., Pittsfield, Mass.	1904
PERRY, Dr. ELTON, 110 Baylor St., Austin, Tex.	1902
PERRY, GEORGE P., Sterling, Ill.	1905
PETERS, JAMES LEE, Walnut Ave., Jamaica Plain, Mass.	1904
PETERSON, CYRUS A., 8 Shaw Place, St. Louis, Mo.	1904
PETTIS, Miss GRACE L., Museum Nat. Hist., Springfield, Mass.	1903
PHELPS, Mrs. J. W., Box 36, Northfield, Mass.	1899
PHILLIPS, ALEXANDER H., Princeton, N. J.	1891
PHILLIPS, JOHN CHARLES, 299 Berkeley St., Boston, Mass.	1904
PHILLIPS, SHERMAN E., Canterbury, N. H.	1904
PIERCE, A. K., Renovo, Pa.	1891
POE, Miss MARGARETTA, 1500 Park Ave., Baltimore, Md.	1899
POMEROY, HARRY KIRKLAND, Box 575, Kalamazoo, Mich.	1894
POOLE, ALFRED D., 401 W. 7th St., Wilmington, Delaware	1901
PORTER, LOUIS H., Stamford, Conn.	1893
PRAEGER, WILLIAM E., Dept. Botany, Univ. Chicago, Chicago, Ill.	1892
PROCTER, JAMES N., R. F. D. 2, Ventura, Cal.	1904
PURDY, JAMES B., Plymouth, Mich.	1893
RADCLIFFE, Mrs. WALLACE, 1200 K St., N. W., Washington, D. C.	1905
RANN, Mrs. MARY L., Manchester, Iowa	1893
RAUB, Dr. M. W., 340 W. King St., Lancaster, Pa.	1890
RAWSON, CALVIN LUTHER, Box 33, Norwich, Conn.	1885
READ, ALBERT M., 1140 15th St. N. W., Washington, D. C.	1895
REAGH, Dr. ARTHUR LINCOLN, 39 Maple St., West Roxbury, Mass.	1896
REDFIELD, Miss ELISA WHITNEY, 29 Everett St., Cambridge, Mass.	1897
REDINGTON, ALFRED POETT, Box 66, Santa Barbara, Cal.	1890
REED, CHESTER A., 75 Thomas St., Worcester, Mass.	1904
REED, Miss EMILY E., 12 Louisburg Sq., Boston, Mass.	1904
REED, HUGH DANIEL, 804 E. Seneca St., Ithaca, N. Y.	1900
REED, Mrs. WILLIAM HOWELL, Belmont, Mass.	1904
REHN, JAMES A. G., Acad. Nat. Sciences, Philadelphia, Pa.	1901
REMICK, J. A., Jr., 300 Marlboro St., Boston, Mass.	1905
REYNOLDS, GEORGE H., 357 Maple St., Springfield, Mass.	1904
RHOADS, CHARLES J., Bryn Mawr, Pa.	1895
RIBYN, ALBERT L., 118 N. 8th St., St. Charles, Mo.	1903

RICHARD, WILLIAM, Cody, Wyoming.....	1904
RICHARDS, Miss HARRIET E., 36 Longwood Ave., Brookline, Mass....	1900
RICHARDS, JOHN BION, 75 Worth St., New York City.....	1888
RICHARDSON, C. H., Jr., 435 S. El Molino Ave., Pasadena, Cal.....	1903
RICHARDSON, Miss HARRIET, 1864 Wyoming Ave., Washington, D.C.....	1905
RICHARDSON, JOHN KENDALL, Wellesley Hills, Mass.....	1896
RIDGWAY, JOHN L., Chevy Chase, Md.....	1890
RIKER, CLARENCE B., 48 Vesey St., New York City.....	1885
RITCHIE, SANFORD, Dover, Me.....	1900
ROBBINS, REGINALD C., 373 Washington St., Boston, Mass.....	1901
ROBERTS, WILLIAM ELY, George School, Bucks Co., Pa.....	1902
ROBINSON, ANTHONY W., 409 Chestnut St., Philadelphia, Pa.....	1903
RODDY, Prof. H. JUSTIN, State Normal School, Millersville, Pa.....	1891
ROGERS, CHARLES H., 109 Patton Hall, Princeton, N. J.....	1904
ROOSEVELT, FRANKLIN DELANO, Hyde Park, N. Y.....	1896
ROOSEVELT, THEODORE, Jr., White House, Washington, D. C.....	1902
ROSS, GEORGE H., 23 West St., Rutland, Vt.....	1904
ROWLEY JOHN JR., 505 Everett Ave., Palo Alto, Cal.....	1889
SABINE, GEORGE K., 30 Irving St., Brookline, Mass.....	1903
SAGE, HENRY M., Menands Road, Albany, N. Y.....	1885
SAMPSON, WALTER BEHRNARD, 36 S. California St., Stockton, Cal.....	1897
SAND, ISABELLA LOW, Ardsley-on-Hudson, N. Y.....	1902
SANDS, AUSTIN LEDYARD, Greenough Place, Newport, R. I.....	1902
SANFORD, HARRISON, 65 W. 50th St., New York City.....	1905
SANFORD, Dr. LEONARD C., 216 Crown St., New Haven, Conn.....	1902
SARGENT, HARRY CLEVELAND, 430 Centre St., Newton, Mass.....	1905
SAVAGE, WALTER GILES, Monteer, Mo.....	1898
SCHMITT, Dr. JOSEPH, Anticosti Island, Quebec.....	1901
SCHMUCKER, Dr. S. C., 610 S. High St., West Chester, Pa.....	1903
SCHUTZE, ADOLPH E., 2306 Guadalupe St., Austin, Texas.....	1903
SCHWARZ, FRANK, 1520 Lafayette Ave., St. Louis, Mo.....	1904
SEISS, COVINGTON FEW, 1338 Spring Garden St., Philadelphia, Pa....	1898
SEVERSON, HENRY P., Winneconne, Wis.....	1902
SHATTUCK, EDWIN HAROLD, Granby, Conn.....	1898
SHAW, HOLTON A., 610 4th Ave., Grand Forks, N. Dakota.....	1898
SHEARER, AMON R., Mont Belvieu, Tex.....	1905
SHEIBLEY, S. B., Dept. of Justice, Washington, D. C.....	1903
SHELDON, CHARLES, 515 Madison Ave., New York City.....	1905
SHOEMAKER, FRANK H., Care of Gen. Auditor U. P. R. R. Co., Omaha, Neb.....	1895
SHROSBREE, GEORGE, Public Museum, Milwaukee, Wis.....	1899
SILLIMAN, HARPER, 562 5th Ave., New York City.....	1902
SMITH, CHARLES PIPER, Stanford University, Cal.....	1898
SMITH, Rev. FRANCIS CURTIS, Boonville, N. Y.....	1903
SMITH, HORACE G., 2918 Lafayette St., Denver, Colo.....	1888
SMITH, Dr. HUGH M., 1209 M St. N. W., Washington, D. C.....	1886
SMITH, LOUIS IRVIN, Jr., 3809 Chestnut St., Philadelphia, Pa.....	1901

SMITH, PHILO W., JR., Mona House, St. Louis, Mo.	1903
SMYTH, Prof. ELLISON A., Jr., Polytechnic Inst., Blacksburg, Va.	1892
SNOW, Prof. FRANCIS H., Univ. of Kansas, Lawrence, Kan.	1903
SNYDER, WATSON, 701 Broad St., Newark, N. J.	1905
SNYDER, WILL EDWIN, 109 E. Mackie St., Beaver Dam, Wis.	1895
SPAULDING, FRED B., Lancaster, N. H.	1894
SPINNEY, HERBERT L., Seguin Light Station, Popham Beach, Me.	1900
STANTON, Prof. J. Y., 410 Main St., Lewiston, Me.	1883
STAPLETON, RICHARD P., 235 High St., Holyoke, Mass.	1904
STEBBINS, Miss FANNIE A., 480 Union St., Springfield, Mass.	1903
STEPHENSON, Mrs. LOUISE MCGOWN, Helena, Ark.	1894
STILLMAN, WILLIAM M., 426 W. 7th St., Plainfield, N. J.	1904
STOCKARD, CHARLES RUPERT, 519 W. 123d St., New York City	1904
STONE, CLARENCE F., Branchport, N. Y.	1903
STONE, DWIGHT D., R. F. D. 3, Oswego, N. Y.	1891
STROUT, CHARLES S., 207 Alfred St., Biddeford, Me.	1904
STURGIS, Mrs. F. L., 3 W. 36th St., New York City.	1904
STURTEVANT, EDWARD, St. George School, Newport, R. I.	1896
STYER, Mrs. KATHARINE R., Concordville, Pa.	1903
SURFACE, Prof. HARVEY ADAM, State Zoölogist, Harrisburg, Pa.	1897
SWAIM, LORING T., 190 Brattle St., Cambridge, Mass.	1905
SWAIN, JOHN MERTON, 10 Bush St., Skowhegan, Me.	1899
SWALES, BRADSHAW HALL, 145 Gladstone Ave., Detroit, Mich.	1902
SWARTH, HARRY S., 356 Belden Ave., Chicago, Ill.	1900
SWENK, MYRON H., 1821 O St., Lincoln, Neb.	1904
SWEZEY, GEORGE, 61 Polk St., Newark, N. J.	1901
TAVERNER, PERCY A., 165 Oakland Ave., Detroit, Mich.	1902
TAYLOR, ALEXANDER O'DRISCOLL, 132 Bellevue Ave., Newport, R. I.	1888
TEST, Dr. FREDERICK CLEVELAND, 4401 Indiana Ave., Chicago, Ill.	1892
THACHER, Mrs. THOMAS W., 21 Dwight St., Brookline, Mass.	1904
THOMAS, Miss EMILY HINDS, The Aldine Hotel, Chestnut St. Phila- delphia, Pa.	1901
THOMPSON, Miss CAROLINE BURLING., Wellesley College, Wellesley, Mass.	1900
THOMPSON, Dr. M. T., Clark University, Worcester, Mass.	1904
THOMPSON, ROY, Cando, N. D.	1905
TOPPAN, GEORGE L., 18 E. 23d St., New York City	1886
TOWNSEND, WILMOT, 3d Ave. and 75th St., Brooklyn, N. Y.	1894
TROTTER, WILLIAM HENRY, 36 N. Front St., Philadelphia, Pa.	1899
TUDBURY, WARREN C., 47 W. 126th St., New York City.	1903
TUFTS, LE ROY MELVILLE, "Thrushwood," Farmington, Me.	1903
TURNER, HOWARD M., 28 Grays Hall, Cambridge, Mass.	1903
TUTTLE, Dr. CARL, Berlin Heights, Ohio.	1890
TWEEDY, EDGAR, 336 Main St., Danbury, Conn.	1902
UNDERWOOD, WILLIAM LYMAN, Mass. Inst. Technology, Boston, Mass.	1900

VALENTINE, Miss ANNA J., Bellefonte, Pa.....	1905
VAN CORTLANDT, Miss ANNE S., Croton-on-Hudson, N. Y.....	1885
VAN HUYCK, JOHN MASON, Lee, Mass.....	1904
VAN NAME, WILLARD GIBBS, 121 High St., New Haven, Conn.....	1900
VAN NORDEN, WARNER MONTAGNIE, Jay Mansion, Harrison, New York	1899
VAN SANT, Miss ELIZABETH, 2960 Dewey Ave., Omaha, Neb.....	1896
VARICK, Mrs. WILLIAM REMSEN, 1015 Chestnut St., Manchester, N. H.....	1900
VETTER, Dr. CHARLES, 152 Second St., New York City.....	1898
VISHER, STEPHEN S., Forestburg, S. Dakota.....	1904
WALES, EDWARD H., Hyde Park, N. Y.....	1896
WALKER, Dr. R. L., 355 Main Ave., Carnegie, Pa.....	1888
WALLACE, Miss LOUISE BAIRD, Mt. Holyoke College, South Hadley, Mass.....	1903
WALLINGSFORD, LEO, 118 S. Black St., Alexandria, Ind.....	1904
WALTER, HERBERT E., Cold Spring Harbor, Long Island, N. Y.....	1901
WALTERS, FRANK, 7 W. 103d St., New York City.....	1902
WARREN, Dr. B. H., Box 245, West Chester, Pa.....	1885
WARREN, EDWARD ROYAL, 20 W. Caramillo St., Colorado Springs, Colo	1902
WATSON, Miss SARAH R., 5128 Wayne St., Germantown, Philadelphia, Pa	1900
WAYNE, ARTHUR T., Mt. Pleasant, S. C.....	1905
WEIR, J. ALDEN, Brandville, Conn.....	1899
WELLS, FRANK S., 916 Grant Ave., Plainfield, N. J.....	1902
WENTWORTH, IRVING H., Matehuala, E. de S. L. P., Mexico.....	1900
WESSEL, LOUIS, Railway Mail Service, Butte, Mont.....	1905
WEST, JAMES A., 33 John St., Champaign, Ill.....	1896
WEST, LEWIS H., Roslyn, N. Y.....	1887
WESTFELDT, GUSTAF REINHOLD, Box 601, New Orleans, La.....	1902
WETMORE, Mrs. EDMUND, 343 Lexington Ave., New York City.....	1902
WHEELER, EDMUND JACOB, 177 Pequot Ave., New London, Conn.....	1898
WHEELER, JOHN B., East Templeton, Mass.....	1897
WHELOCK, Mrs. IRENE G., 1040 Hinman Ave., Evanston, Ill.....	1902
WHITCOMB, Mrs. HENRY F., 721 Franklin St., Milwaukee, Wis.....	1897
WHITE, FRANCIS BEACH, 6 Phillips Place, Cambridge, Mass.....	1891
WHITE, GEORGE R., P. O. Dept., Ottawa, Ont.....	1903
WHITE, W. A., 130 Water St., New York City.....	1902
WICKERSHAM, CORNELIUS W., 22 Apley Court, Cambridge, Mass.....	1902
WICKS, M. L., Jr., 128 I. W. Hellman Block, 2nd St. and Broadway, Los Angeles, Cal.....	1890
WILBUR, ADDISON P., 60 Gibson St., Canandaigua, N. Y.....	1895
WILCOX, Dr. EMMA D., 307 W. 98th St., New York City.....	1905
WILCOX, T. FERDINAND, 115 W. 75th St., New York City.....	1895
WILDE, MARK L. C., 315 N. 5th St., Camden, N. J.....	1893
WILLIAMS, J. BICKERTON, 24 Ann St., Toronto, Ontario.....	1889

WILLIAMS, RICHARD FERDINAND, Box 521, New York City.....	1902
WILLIAMS, ROBERT S., New York Botanical Gardens, Bronx Park, New York City.....	1888
WILLIAMS, ROBERT W., Jr., U. S. Dept. of Agriculture, Washington, D. C.....	1900
WILLIAMSON, E. B., Bluffton, Ind.....	1900
WILSON, SIDNEY S., German Amer. Bank Bldg., St. Joseph, Mo.	1895
WINSLETT, Miss MARY E., Stevensville, Mont.....	1904
WISLER, J. JAY, 231 Cherry St., Columbia, Pa.....	1903
WISTER, WILLIAM ROTCH, 505 Chestnut St., Philadelphia, Pa.....	1904
WOLFE, WILLIAM EDWARD, Box 7, Wray, Colo.....	1900
WOOD, J. CLAIRE, 179 17th St., Detroit, Mich.....	1902
WOOD, NELSON R., Smithsonian Institution, Washington, D. C....	1895
WOOD, NORMAN A., 1216 S. University Ave., Ann Arbor, Mich.....	1904
WOOD, S. T., 229 Beverley St., Toronto, Ont.....	1904
WOODCOCK, ARTHUR ROY, Corvallis, Oregon.....	1901
WOODRUFF, EDWARD SEYMOUR, 14 E. 68th St., New York City.....	1899
WOODRUFF, FRANK M., Acad. Sciences, Chicago, Ill.....	1904
WOODRUFF, LEWIS B., 14 E. 68th St., New York City.....	1886
WOODWORTH, Mrs. NELLY HART, 41 Bank St., St. Albans, Vt.....	1894
WORTHEN, CHARLES K., Warsaw, Ill.....	1891
WORTHINGTON, WILLIS W., Fernandina, Fla.....	1889
WRIGHT, HORACE WINSLOW, 82 Myrtle St., Boston, Mass.....	1902
WRIGHT, SAMUEL, Conshohocken, Pa.....	1895
WYCKOFF, Miss FLORENCE A., 113 E. Chemung Pl., Elmira, N. Y....	1905
ZAPPEY, WALTER R., 19 Norfolk St., Roslindale, Mass.....	1905
ZERRAHN, CARL OTTO, Milton, Mass.....	1904

DECEASED MEMBERS.

FELLOWS.

	<i>Date of Death.</i>
BAIRD, SPENCER FULLERTON.....	Aug. 19, 1887
BENDIRE, CHARLES E.	Feb. 4, 1897
COUES, ELLIOTT.....	Dec. 25, 1899
GOSS, N. S.....	March 10, 1891
HOLDER, JOSEPH B.....	Feb. 28, 1888
JEFFRIES, JOHN AMORY.....	March 26, 1892
McILWRAITH, THOMAS.....	Jan. 31, 1903
MERRILL, JAMES C.....	Oct. 27, 1902
SENNETT, GEORGE BURRITT.....	March 18, 1900
TRUMBULL, GURDON.....	Dec. 28, 1903
WHEATON, JOHN M.....	Jan. 28, 1887

HONORARY FELLOWS.

BURMEISTER, HERMANN.....	May 1, 1892
CABANIS, JEAN.....	Feb. 20, 1906
GÄTKE, HEINRICH.....	Jan. 1, 1897
GUNDLACH, JUAN.....	March 14, 1896
GURNEY, JOHN HENRY.....	April 20, 1890
HARTLAUB, GUSTAV.....	Nov. 20, 1900
HUXLEY, THOMAS H.....	June 29, 1895
KRAUS, FERDINAND.....	Sept. 15, 1890
LAWRENCE, GEORGE N.....	Jan. 17, 1895
MILNE-EDWARDS, ALPHONSE.....	April 21, 1900
PARKER, WILLIAM KITCHEN.....	July 3, 1890
PELZELN, AUGUST VON.....	Sept. 2, 1891
SALVIN, OSBERT.....	June 1, 1898
SCHLEGEL, HERMANN.....	Jan. 17, 1884
SEEBOHM, HENRY.....	Nov. 26, 1895
TACZANOWSKI, LADISLAS.....	Jan. 17, 1890

CORRESPONDING FELLOWS.

ALTUM, C. A.....	Jan. 1, 1900
ANDERSON, JOHN.....	Aug. 16, 1900
BALDAMUS, EDUARD.....	Oct. 30, 1893
BLAKISTON, THOMAS W.....	Oct. 15, 1891
BOGDANOW, MODEST N.....	March 4, 1888
BRYANT, WALTER, E.....	May 21, 1905
COOPER, JAMES G.....	July 19, 1902
CORDEAUX, JOHN.....	Aug. 1, 1899
DAVID, ARMAND.....	Nov. 10, 1900
FATIO, VICTOR.....	March 19, 1906
HAAST, JULIUS VON.....	Aug. 15, 1887
HARGITT, EDWARD.....	March 19, 1895
HOLUB, EMIL.....	Feb. 21, 1902
HOMeyer, E. F. VON.....	May 31, 1889
LAYARD, EDGAR LEOPOLD.....	Jan. 1, 1900
LEVERKÜHN, PAUL.....	Dec. 5, 1905
LYTTLETON, THOMAS, LORD LILFORD.....	June 17, 1896
MARSHALL, A. F.....	Oct. 11, 1887
MALMGREN, ANDERS JOHAN.....	April 12, 1897
MIDDENDORFF, ALEXANDER THEODORE VON.....	Jan. 28, 1894
MOSJISOVICS, F. G. HERMANN AUGUST.....	Aug. 27, 1897

OUSTALET, EMILE.....	Oct. 23, 1905
PHILIPPI, R. A.....	Aug. — 1904
PREJEVALSKI, N. M.....	Oct. 20, 1887
PRENTISS, D. WEBSTER.....	Nov. 19, 1899
PRYER, HARRY JAMES STOVIN.....	Feb. 17, 1888
RADDE, GUSTAV FERDINAND.....	— 1903
SCHRENCK, LEOPOLD VON.....	Jan. 20, 1894
SÉLEYS-LONGSCHAMPS, EDMOND DE.....	Dec. 11, 1900
SEVERTZOW, N.....	Feb. 8, 1885
STEVENSON, HENRY.....	Aug. 18, 1888
TRISTRAM, H. B.....	March 8, 1906
WHARTON, HENRY T.....	Sept. —, 1895
WOODHOUSE, SAMUEL W.....	Oct. 23, 1904

MEMBERS.

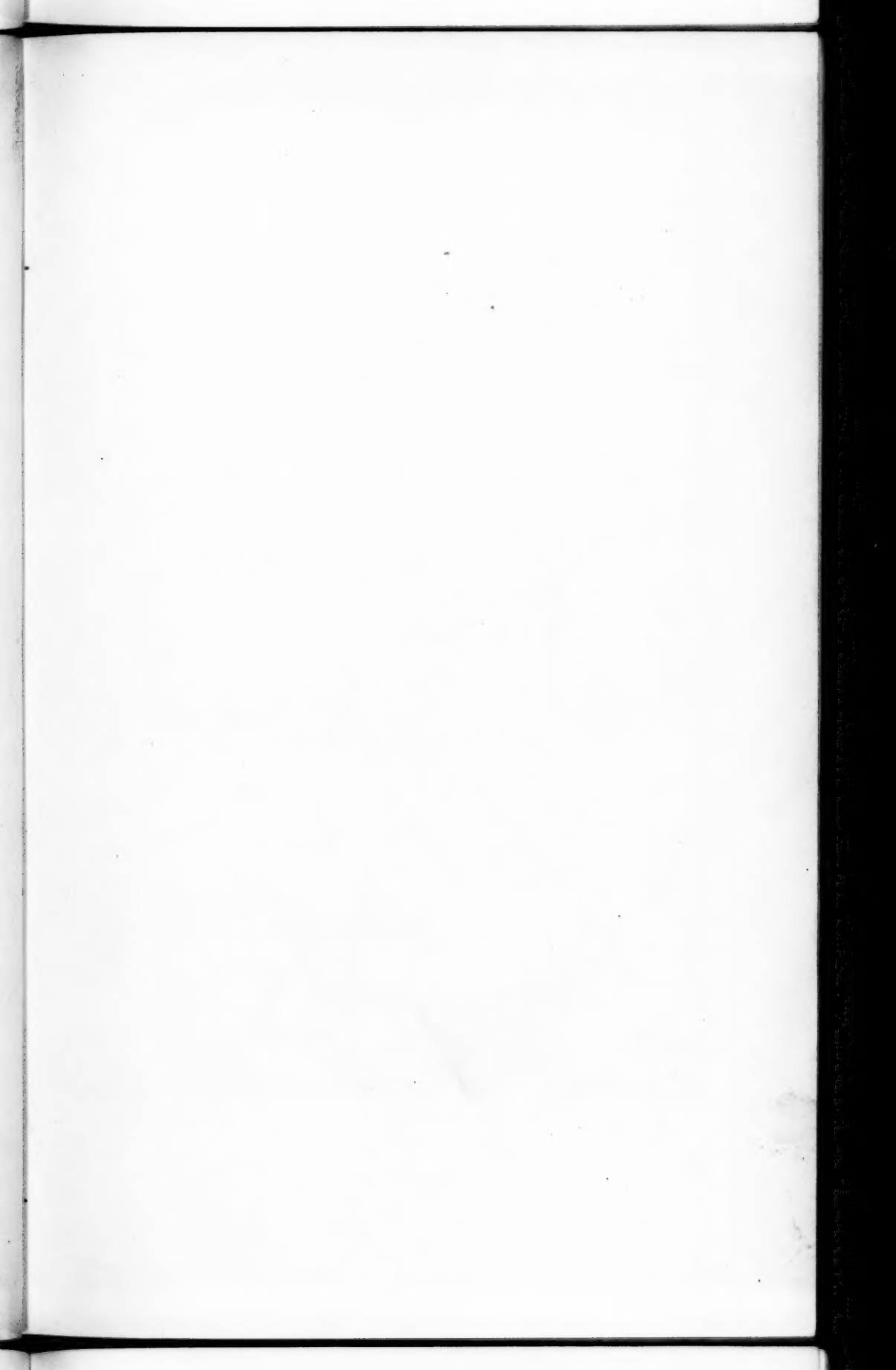
FANNIN, JOHN.....	June 20, 1904
JUDD, DR. SYLVESTER D.....	Oct. 22, 1905

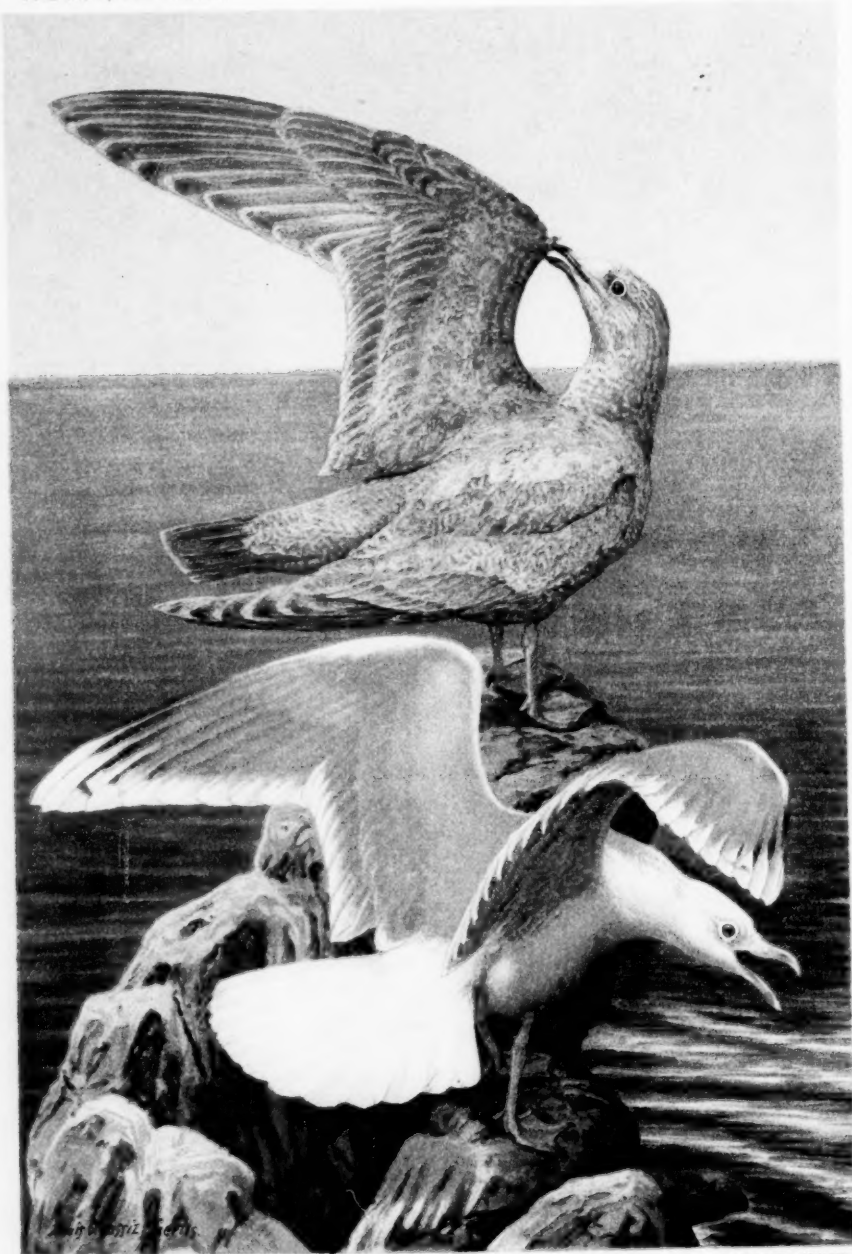
ASSOCIATES.

ADAMS, CHARLES F.....	May 20, 1893
ALLEN, CHARLES SLOVER.....	Oct. 15, 1893
ATKINS, H. A.....	May 19, 1885
AVERY, WILLIAM CUSHMAN.....	March 11, 1894
BAILEY, CHARLES E.....	—, 1905
BARLOW, CHESTER.....	Nov. 6, 1902
BAUR, GEORGE.....	June 25, 1898
BECKHAM, CHARLES WICKLIFFE.....	June 8, 1888
BILL, CHARLES.....	April —, 1897
BIRTWELL, FRANCIS JOSEPH.....	June 29, 1901
BOARDMAN, GEORGE A.....	Jan. 11, 1901
BOLLES, FRANK.....	Jan. 10, 1894
BRACKETT, FOSTER H.....	Jan. 5, 1900
BREESE, WILLIAM L.....	Dec. 7, 1889
BRENINGER, GEORGE FRANK.....	Dec. 3, 1905
BROKAW, L. W.....	Sept. 3, 1897
BROWN, JOHN CLIFFORD.....	Jan. 16, 1901
BROWNE, FRANCIS CHARLES.....	Jan. 9, 1900
BURNETT, LEONARD E.....	March 16, 1904
CAIRNS, JOHN S.....	June 10, 1895

CALL, AUBREY BRENDON	Nov. 20, 1901
CAMPBELL, ROBERT ARGYLL	April —, 1897
CANFIELD, J. B.	Feb. 18, 1904
CARTER, EDWIN	— 1900
CLARK, JOHN N.	Jan. 13, 1903
COLBURN, W. W.	Oct. 17, 1899
COLLETT, ALONSO M.	Aug. 22, 1902
CORNING, ERASTUS, JR.	April 9, 1893
COE, W. W.	April 26, 1885
DAFFIN, WM. H.	April 21, 1902
DAKIN, JOHN A.	Feb. 21, 1900
DEXTER, NEWTON	July 27, 1901
ELLIOTT, S. LOWELL	Feb. 11, 1889
FAIRBANKS, FRANKLIN	April 24, 1895
FOWLER, J. L.	July 11, 1899
GESNER, A. H.	April 30, 1895
GOSS, BENJAMIN F.	July 6, 1893
HATCH, JESSE MAURICE	May 1, 1898
HOADLEY, FREDERIC H.	Feb. 26, 1895
HOLMES, LARUE KLINGLE	May 10, 1906
HOOPES, JOSIAH	Jan. 16, 1904
HOWLAND, JOHN SNOWDON	Sept. 19, 1885
INGERSOLL, JOSEPH CARLETON	Oct. 2, 1898
JENKS, JOHN W. P.	Sept. 27, 1894
JESURUN, MORTIMER	March —, 1905
JOUY, PIERRE LOUIS	March 22, 1894
KNIGHT, WILBUR CLINTON	July 8, 1903
KNOX, JOHN C.	July 9, 1904
KNOX, JOHN COWING	June 1, 1904
KUMLIEN, LUDWIG	Dec. 4, 1902
KUMLIEN, THURE	Aug. 5, 1888
LAWRENCE, ROBERT HOE	April 27, 1897
LINDEN, CHARLES	Feb. 3, 1888
MABBETT, GIDEON	Aug. 15, 1900
MARBLE, CHARLES C.	Sept. 25, 1900
MARCY, OLIVER	March 19, 1899
MARIS, WILLARD LORRAINE	Dec. 11, 1895
McKINLAY, JAMES	Nov. 1, 1899
MEAD, GEORGE S.	June 19, 1901
MINOT, HENRY DAVIS	Nov. 13, 1890
MORRELL, CLARENCE HENRY	July 15, 1902
NICHOLS, HOWARD GARDNER	June 23, 1896
NIMS, LEE	March 12, 1903
NORTHROP, JOHN I.	June 26, 1891
PARK, AUSTIN F.	Sept. 22, 1893
PAULMIER, FREDERICK CLARK	March 3, 1906

POMEROY, Miss GRACE V.....	May 14, 1906
RAGSDALE, GEORGE H.....	March 25, 1895
READY, GEORGE H.....	March 20, 1903
RICHARDSON, JENNESS.....	June 24, 1893
ROBINS, Mrs. EDWARD.....	July 2, 1906
SELOUS, PERCY SHERBORN.....	April 7, 1900
SLATER, JAMES H.....	Feb. —, 1895
SLEVIN, THOMAS EDWARDS.....	Dec. 23, 1902
SMALL, EDGAR A.....	April 24, 1884
SMITH, CLARENCE ALBERT.....	May 6, 1896
SOUTHWICK, JAMES M.....	June 3, 1904
STOWE, W. H.....	March —, 1895
THORNE, PLATTE M.....	March 16, 1897
THURBER, E. C.....	Sept. 6, 1896
VENNOR, HENRY G.....	June 8, 1884
WATERS, EDWARD STANLEY.....	Dec. 26, 1902
WILLARD, SAMUEL WELLS.....	May 24, 1887
WOOD, WILLIAM.....	Aug. 9, 1885
YOUNG, CURTIS C.....	July 30, 1902





LARUS KUMLIENI BREWSTER.

UPPER FIGURE, JUVENAL; LOWER FIGURE, ADULT.

THE AUK:

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No. 1.

LIST OF THE BIRDS OF LOUISIANA.

BY GEO. E. BEYER, ANDREW ALLISON, AND HENRY H. KOPMAN.

PART I.—PRELIMINARY SKETCH.

THE most striking feature of the well known topographical and corresponding biotic variety in Louisiana is the absolute contrast between the biota of the fertile and extended delta plain of the Mississippi in the southeastern part of the State and the biota of every type of Louisiana country to the west and north and north-west, except the remaining portion of the general flood plain of the Mississippi lying within the borders of Louisiana.

In the keenness of this distinction should be founded every attempt to understand the distribution of avian as well as all other life in this decidedly remarkable State; for since the low southeastern section referred to as the delta plain touches almost every other topographic type in Louisiana, great value is given to a study of life along the line of divergence between the extreme lowland in the southeast and all the slightly or much more elevated country of different soil conformations of Louisiana. The ecological problems here involved are scarcely to be paralleled elsewhere.

A view of the Louisiana avifauna might properly be focused in the southeastern part of the State merely in recognition of the uncommon difference between bird life as found in that section and as found in all other parts of the United States. The immense and, in some ways, peculiar development of aquatic bird life in southeast Louisiana especially, and a lesser, but corre-

sponding, development of bird life representing the higher orders, make this the peculiarly characteristic region of the State. This is the section to which has attached all bird-lore preëminently



MAP OF LOUISIANA.

Louisianian: it was chiefly through the exploitation of this region that Audubon brought the State of his birth so prominently before the ornithological world.

On account of the general, as well as the purely scientific interest involved, therefore, the ornithology of Louisiana offers its greatest and most attractive problems in a study of the correlative dispersal of species between this section and the remaining regions of the State.

Before considering in a general way the various types of country in Louisiana, we will take up several of the factors that make the southeast delta plain unlike all the other regions. The silt of the Mississippi deposited over its flood plain bears no evergreen conifers, and in such soil the entire coniferous tribe is unrepresented except for one species, the bald cypress (*Taxodium distichum*). The tree-growth of the delta plain is a most unusual development of deciduous trees unbroken by native evergreen arboreal growths except the live oak and the partially evergreen water oaks. In addition to these and the cypress, the predominant species of trees are red maple, ash, willow, tupelo (*Nyssa uniflora*), and box elder (*Negundo*) in the wetter situations; elms (*Ulmus americana* and *U. fulva*) nearly everywhere; Texas red oak in rich wet woods, and in drier localities with hackberry, honeylocust, cottonwood, sweet gum, and sycamore. Several species of haw, dogwood, and holly are found in considerable abundance. The lesser shrub growth is uninteresting, and contains but one evergreen, the wax myrtle. Over a large part of the area, the button-bush (*Cephalanthus*) is the most conspicuous shrub. It will be noticed that magnolia, *as a native*, is entirely absent from this region. In fact, the tree flora, if considered from the standpoint of separate species, is by no means peculiar or attractive. The tupelo, the cypress, and the live and water oaks are the only trees in any degree characteristic. The distinction of the extreme lowlands is the conspicuousness of certain familiar trees on higher ground, to the exclusion of many others equally characteristic of more elevated regions. In fact, the country under consideration exhibits a decided floral paucity except among certain of the cryptogamous orders. There is less peculiarity in the floral units than in the exuberance of certain growths, and in the manner of their distribution, combination, and adaptation.

The topographical peculiarity of this territory is the extent of its water-broken coast. The breadth of its marshes, the various

ramification of its sluggish bayous, and the impenetrability of its cypress fastnesses need hardly be reiterated wherever the literature of the time is known. In the particularly water-broken territory in the region of the lower Mississippi, however, there are features worth notice from a distributional standpoint. The region under immediate consideration lies between the 89th and 92nd degrees of west longitude and between the 29th degree of north latitude and a line following rather closely the northern shores of Lakes Pontchartrain and Maurepas, westward to about New Iberia, in central southern Louisiana. Such a line gives about the extreme southern breeding limit of the Baltimore Oriole, the Yellow-throated Vireo, and the Yellow Warbler. Continued still farther westward, to Lake Charles, in southwest Louisiana, this line in its full extent will give about the beginning of the rise to the highlands of the State, which are pronounced at such points as Covington, Baton Rouge, and Opelousas. New Orleans, on the other hand, is in the very heart of the typical low alluvial plain.

The marshes of southeast Louisiana extend in from the coast for varying distances, according to the conformation of the 'lakes,' and the courses of the streams. Whether the 'lakes' are salt or fresh depends, of course, upon the distance from the sea, and the volume of the streams with whose outflow they come into contact. The 'lakes' are merely the remains of former marginal bays, and, at present, the streams not only flow into them, but, in a majority of cases, flow out of them again. Lake Pontchartrain, though landlocked except for several small outlet channels, is comparatively salt. Some of those now a considerable distance inland, on the other hand, exhibit no salinity whatever. Just as between the fresh 'lakes' and the salt 'lakes,' no sharp line can be drawn, so between the latter and the ordinary inlets and bays of the Gulf, no exact distinction can be made. The consequent variability of the character of the marsh is readily appreciated.

It will be seen also that this variability is important in determining the comparative abundance of water birds in different localities of a region which casual inspection might pronounce uniform. As the seasons change, and with them the nature of avian requirements, certain species in this region show varying choices of localities. Moreover, different individuals of the same species appear

in the State in various rôles according to the season, and consequently their dispersion throughout this region will show much variation. These remarks apply especially to the Terns, the Herons, and the Rails, and to such semi-aquatic species among the higher orders as the Red-winged Blackbird and the Seaside Sparrow.

A feature of the immediate delta and southeast coast region of interest is the presence of hundreds of islands, some purely marshy, some more or less sandy, a few formed chiefly of shells, and still others formed entirely from the muddy deposits of the Mississippi, according, in each case, to the relative influence exerted by the building operations of the sea and by those of the river. The character of these islands is of great importance in studying the distribution of the terns on the coast, and is a subject that has scarcely been touched yet from a careful ecological standpoint.

The chief shrubby and arboreal growth of these islands is wax myrtle and dwarfed live oaks. The fishermen of the region often speak of 'mangrove,' but they use the word as a generic term. Prof. S. M. Tracy, expert of the U. S. Department of Agriculture and resident on the Gulf Coast, tells us that he has never found the mangrove on the islands about the mouth of the Mississippi, and that he doubts exceedingly its occurrence so far north.

In the main body of the marsh — what, in fact, might be called mainland — the occurrence of thickets and 'islands' of wax myrtle and small live oaks is characteristic. The more important growth, along some of the streams and about the borders of the 'lakes,' is chiefly cypress; these cypress brakes are outrunners of the swamps further inland.

At the latitude of New Orleans, except for the little marshy corner of the State on the east, and one or two similar small regions to the west, the continuity of the swamp *woodland* is practically unbroken, except for the water surfaces. Here again, however, there are small but important distinctions to be made. Owing to the continual elevation of the flood plain of the Mississippi, districts along the bank of the river have been raised entirely above the level of standing swamp water, while water from overflow has been made the rare exception by the levee system. Consequently, there is a considerable amount of comparatively dry woodland in

the parishes bordering the Mississippi in southeast Louisiana, and its bird life is appreciably different from that of the typical cypress and tupelo swamp.

The alternation of these two very mobile types of woodland with one another, and with the less important marshes, gives another highly interesting set of problems in distribution. With the gradual elevation of the country, such species as the Bob-white, the Florida Blue Jay, the Southern Meadowlark, and the Towhee, are gradually acquiring a wider coastwise dispersion. Some spots in this region, though probably not more than eight or ten feet above sea-level, have positively a slight upland cast in the appearance of their woodland, and the effect of this difference upon bird life cannot be better appreciated than during the migrations, when transient life will be largely attracted to such spots.

The peculiarity of the delta plain region is attested in a variety of ways. By virtue of its latitude, Louisiana might be expected to attract a considerable number of tropical birds in summer. As a matter of fact, however, it does not. But the few tropical birds occurring in the State in the warmer months seem restricted to the delta plain region.

To just what extent the avifauna of southeast Louisiana partakes of a tropical nature is shown by the occurrence and status of the following species: The Booby is a rather rare summer visitor to the water-broken region of the southeast; the Scarlet Ibis appears at exceedingly rare intervals; the White-winged Dove has been found in limited numbers on the coast islands; the Mangrove Cuckoo is alleged to occur there; while the Ani (*Crotophaga ani*) and the Groove-billed Ani (*Crotophaga sulcirostris*) are both very rare.

Another measure of the peculiarity of this region, as well as of its tropical affiliation, is the coastwise wintering of species mostly extra-limital at that season. But the winter conditions in even the southernmost part of Louisiana are not what would be expected of a region popularly estimated as subtropical. The margin of difference between fact and assumption in this matter may be gauged with some accuracy by the following data: The White-eyed Vireo and the Blue-gray Gnatcatcher winter casually in this section; the Tree Swallow winters irregularly, but sometimes

abundantly; while the Barn Swallow is supposed to winter along the coast in small numbers. Other species present very rarely in winter but apparently not by accident, will be considered in this connection in the systematic annotation.

The coast winter is usually sufficiently mild to attract a large number of the Limicolæ. Of the nearly forty species of this order so far recorded from Louisiana, fully half are represented by wintering individuals. Some of these individuals belong to resident species, as the Willet, the Killdeer, and the Wilson's Plover, while others represent species for the most part transient, such as the Dowitcher and the Semipalmated Plover.

The effect of winter on the Herodiones is much more pronounced than in the case of the Limicolæ. The reason is apparent; the congeniality of their summer habitat is affected not only by the mere fact of lower temperatures, but also by the practical defoliation of these abodes; for most vegetation is truly dormant, for a short period, in even the Louisiana coast winter. Consequently, a large part of the marsh and swamp habitats of the herons is rendered unfit for their resort; and as their feeding grounds lie among such places rather than on the beaches and mudflats, as in the case of a majority of the Limicolæ, their numbers in winter are greatly reduced. In fact, the Louisiana, Little Blue, Snowy, and Green Herons, the Reddish Egret, and apparently the Yellow-crowned Night Heron, are entirely absent in winter, while the numbers of all other species, except the American Bittern, essentially a winter visitor, are much diminished.

There appears to be no time in the Louisiana winter when all individuals of the several species of ducks occurring regularly in the State have been driven from the coast. Even the more southern wintering species, such as the Pintail, and even the Blue-winged Teal and others that pass far into the tropics, are usually represented in southern Louisiana to a considerable extent throughout the winter.

As for the other extreme of winter bird life in southern Louisiana, that of species driven south by occasional blizzards reaching to the Gulf Coast, it is not particularly striking. Such species as the Scoters, the Long-tailed Duck, and the Snow Bunting have been brought this far south on several occasions; but with the

exception of a slight increase of species already represented in the wintering bird life of the southern section, there is usually no great interest attached to these periods of unseasonable weather, which generally come about the middle of February. Even in deciduous southern forests, there is commonly considerable shelter, thus obviating the necessity of great movement of winter species when the blizzards strike far south.

To return to a more specific consideration of the elements that make southeast Louisiana unique in its avifauna, we find that possibly the most important of these is the absence of certain species very familiar in other regions. The Chipping Sparrow, for instance, has never, to our knowledge, been found in the fertile alluvial plain, while other common species, such as the Bluebird, have very circumscribed breeding areas within the region, and are general in distribution only in winter. Even at that season they are rarely common. The Bluebird, however, is apparently becoming better established, and recently we have found it at New Orleans in the nesting season. The Kingbird is decidedly uncommon in the region more closely adjacent to New Orleans, and appears in regular numbers only in the pine woods to the east, in Mississippi, in the pine flats and hills to the north, in Louisiana, and on towards the prairies in southwest Louisiana. About the same conditions prevail with regard to the Nighthawk and the Cowbird, and, less conspicuously, in the case of the Southern Meadowlark. Another peculiarity is the absence of all Nuthatches in southeastern lowland Louisiana.

The positive peculiarities of this region of the State are the abundance of Orchard Orioles and the abundance of wet woodland warbler life. Hooded and Prothonotary Warblers are astonishingly plentiful, and so is the Parula Warbler in certain localities, especially the neighborhood of New Orleans. The fondness of Swainson's Warbler for the growths of 'switch cane' (*Arundinaria tecta*) bring it to this section of the State as well as to the river bottoms in higher areas. But the distribution of this warbler is distinctly local in the former region. In fact, we have found it only near New Orleans, and we have not secured proof of its breeding there. The Sycamore Warbler, of course, is representative of this region, and especially of the lake and bayou cypress swamps.

The Kentucky Warbler is common in moist level woodland throughout the region. Other characteristic species are the Yellow-billed Cuckoo, the Green-crested Flycatcher, the White-eyed Vireo, and the Yellow-breasted Chat. The characteristic breeding finches are the Cardinal and the Painted Bunting. No other breeding finches, except the Towhee and the Indigo Bunting, in comparatively small numbers, are recorded for this section, though the Dickcissel is a hypothetical breeder in this area, and is always found in summer to the very eastern edge of the prairie region on the west.

A species whose range in Louisiana might almost be said to define the area under consideration is the Florida Grackle.

Catbirds and Thrashers are absent in summer, as, indeed, from most of the State. The normal abundance of Crested Flycatchers, Wood Pewees, Summer Tanagers, and Red-eyed Vireos, however, and the presence of the Wood Thrush as a breeder in much smaller numbers than these species, make it still more difficult to discover the exact set of characters to which should be attributed some of the deficiencies in summer.

In migration, the country is stamped somewhat peculiar through the practical absence of the northern breeding and extralimital wintering *Dendroica* and most of the other northern breeding *Mniotiltidae*, except, of course, the Myrtle Warbler. The usual inconspicuousness of this class of warblers, however, is more or less characteristic of all the adjoining regions in both Louisiana and Mississippi, and, in fact, almost throughout the coastal plain of the Gulf States.

Even the more southern breeding warblers, such as the Black-and-white, Worm-eating, Yellow, and Redstart, are uncommon migrants throughout this Louisiana area in spring. In fall, the conditions are not so unusual. Notable exceptions in fall to the conditions found in spring are the more southern breeding warblers, and two of the more northern breeding, the Magnolia and the Tennessee. The last two are among the commonest migrants in October.

In winter, the conditions approach more nearly to what would be considered normal somewhat to the north. The principal exception to this statement is afforded in the small variety of win-

tering sparrows, which are practically limited to an abundance of Swamp, White-throated, and Savanna Sparrows. The Song Sparrow is practically unknown in this region. As has been stated already, the Chipping Sparrow does not occur at any season. White-crowned and Fox Sparrows are decidedly rare, and Vesper and Field Sparrows are about equally uncommon. The Myrtle Warbler, on the other hand, is remarkably abundant in winter. The Orange-crowned Warbler is often abundant in mid-winter, but never, of course, to the same degree as the Myrtle Warbler. The Pine Warbler invades this area from the pine regions. The Blue-headed Vireo is a characteristic, though not particularly common, mid-winter bird. The Purple Finch is seen chiefly in winters when there has been unusually severe weather, this species being somewhat of an exception to the statement made previously in this connection. The Junco, however, rarely reaches to the lowland. There is nothing especially peculiar in the winter distribution of Kinglets, Hermit Thrushes and Robins; Brown Creepers are more apt to be found in the pine region.

Several special topographical developments in the flood plain of the Mississippi may properly be treated with an account of the extension of the delta plain, for the lands bordering both banks of the Mississippi towards the south, and those bordering the west bank practically throughout the length of the State, display about the same characteristics in this entire distance. Of the special developments referred to, the most noticeable in the south is the formation of land outside the levees; in many cases, this land is subject partly or wholly to annual overflow. Such formation in southeast Louisiana is known as 'batture' (land that has been built by the river). Its principal tree growths are willow, cottonwood, and hackberry, with a varying amount of the other species characteristic of the drier soils of the lowland, but especially sycamore and honey-locust. These battures become perfectly dry, and, in fact, very well drained after the spring rises are past, but their moist and often partly flooded condition in spring and early summer makes them attractive to many birds. The manner of tree growth on the pure silt here deposited by the Mississippi is substantially different from that in the swamp lands away from the river. The even and somewhat open river bottom woodland

found regularly along the higher course of the Mississippi is roughly duplicated on these batture lands, whose avifauna, especially in migration, is frequently worth careful investigation.

Much of the flood-plain of the Mississippi along the northern half of its course in Louisiana is marked by very heavy swamp and a multiplicity of shallow woodland lakes, formed by cut-offs and ox-bow loops of the river. The water-bird life of the southeastern part of the State is reflected in this region.

Passing on to a broader consideration of topographical division in Louisiana, we thus have: (1) an extreme lowland coastal plain, including, as already described, the fertile delta plain of marshes and wet woodland and cypress swamp in the east, and the prairies and marshes in the west; and (2) an upland region, exhibiting successive degrees of elevation, from south to north, beginning with the slightly elevated long-leaf pine flats, and continuing through the long-leaf pine hills, and the uplands of short-leaf pine, oak, and hickory. This upland region, however, is traversed by the flood plains of the Mississippi and Red Rivers; the former extends along the eastern border of the State, the latter runs diagonally from the northwest corner and joins the Mississippi plain somewhat below the center of the State.

The transition from the river bottoms is chiefly direct in the case of Red River; along the Mississippi, however, it frequently occurs through a type of country not heretofore noticed. This further type is known as the blufflands (the cane hills of Hilgard). It is a more or less broken and elevated region, lacking extensive growths of pine, but showing a characteristic mixture of oaks, hickory, magnolia, and beech. These blufflands not only border the Mississippi flood plain, but in many instances, on the eastern side, in both Louisiana and Mississippi, extend to the river itself, so that the west shore at many points is flat and fertile alluvial, while the corresponding east shore shows precipitous banks, such as the hills upon which Baton Rouge, Natchez, and Vicksburg are situated.

The general similarity between the delta plain in southeast Louisiana and the rest of the Mississippi flood-plain lying within the State, has already been noted. The typical parts of the flood-plain throughout its length are essentially the same. Towards the north, of course, the general elevation is greater, and of interest are the

ecological differences naturally to be expected on account of the differences in altitude and latitude between the northern and southern parts of the flood-plain. But probably of more importance is the occasional occurrence of modified forms of the blufflands type of country protruding into the upper half of the alluvial plain.

The relation of the Red River bottoms to their contiguous country is by no means homologous to the case of the Mississippi River. The sharpness of distinction between the Mississippi bottoms in Louisiana and the adjoining upland country is not duplicated in the case of the Red River, although the transition in the latter case may be more direct.

Of the pine regions in Louisiana, the uplands of short-leaf pine and the long-leaf pine hills have about equal extension. The short-leaf pine uplands are confined almost entirely to the northwestern section of the State. There is a small area in the southeast, being an extension of this region as it occurs in Mississippi; in southeast Louisiana it occurs between cane hills on the west and long-leaf pine hills on the east.

The region of long-leaf pine hills occupies a large area in the central and western parts of the State, and a considerable strip in the east.

The pine forests of these upland regions are diversified, of course, by various broad-leaved growths, which are more or less confined to creek and small river bottoms. The predominant broad-leaved forms throughout the upland region of the State are beech, oak, hickory, and magnolia.

The long-leaf pine flats in Louisiana form two widely separated regions, one in the southwest and the other in the southeast.

In the southeast, this type is the most striking antithesis of the recently deposited fertile alluvial. Its peculiarity as a biotic area is more readily stated than that of the fertile alluvial, yet it is by no means so different from all other regions. It is preëminently the habitat of such resident species as the Red-cockaded Woodpecker, the Loggerhead Shrike (which never breeds in the fertile alluvial, and appears to winter there in smaller numbers than the Migrant Shrike), the Pine Warbler, the Brown-headed Nuthatch, and the Bluebird.

The most varied bird life of this region is to be found in the

heavily wooded river bottoms, in the mixed growths on the higher banks of streams, and in those diversifications of the flatter pine forests known as 'bay galls' or 'bayheads,' which are merely slight depressions, grown to the sweet bay (*Magnolia virginiana*), black gum (*Nyssa biflora*), red maple, and various shrubs peculiar to the region, such as, *Cyrtilla*, *Illicium* (rose bay), and various ericaceous plants. One characteristic set of summer birds found in such situations, especially towards the south and in the lower growths, consists of the Wood Thrush, Parula and Hooded Warblers, White-eyed and Red-eyed Vireos, and Green-crested and Crested Flycatchers. Further north, from about the parallel of 31 degrees north, should be added the Yellow-throated Vireo, Worm-eating Warbler, and Louisiana Water-thrush.

The pine flats of the southwest merge gradually into the prairie section, which is sparingly pine-bearing almost to the coast. In scarcely any particular is this prairie region similar to the fertile alluvial region of the east. The change from its red and yellow clay soil conformation, however, to the muddy lands of the Mississippi, is very gradual, country of indeterminate nature stretches fifteen or twenty miles each side of the town of New Iberia. The most conspicuous feature of summer bird life on the prairies is the abundance of Mourning Doves, Nighthawks, Kingbirds, and Meadowlarks.

Along the coast, about the eastern edge of the prairie section, are situated the 'Five Islands,' pronounced by geologists to be without American homologues. They are hills in the marshy or prairie-land region. They have proved to be scarcely less interesting from faunistic and floristic standpoints than from a geological point of view. In their avifauna, however, they have been found less peculiar than might have been expected. The wealth of their woodland in a somewhat thinly wooded area has attracted large numbers of birds; but beyond this, no facts of particular ecological importance have been observed, except that in migration these spots attract a rather larger variety of birds than are found at corresponding times in the surrounding country.

It should be noted further of the prairie section that its river bottoms are fully as well wooded as those of any other section of the State, and along the rivers and bayous, and about the lakes

in the marshes that border it coastwise, are found swamp growths of the greatest luxuriance.

It is to the prairie section of Louisiana that are most naturally attracted western forms not found to any great extent in other regions of the State. Such is true of Sprague's Pipit, the Yellow-headed Blackbird, and the Swallow-tailed Flycatcher. Sprague's Pipit, however, is by no means unusual at New Orleans, while the Swallow-tailed Flycatcher at least is casual there. The Louisiana Tanager, which has been recorded once from the vicinity of New Orleans, and Brewer's Blackbird, which has been taken in the same region on several occasions, might both be expected to occur casually in the southwestern part of the State.

Summarized, the more important points of distribution in Louisiana give the following view:

Inland water-bird life includes chiefly the following forms: Residents — *Podilymbus*, *Larus atricilla* (may not breed in the interior), *Anhinga*, *Phalacrocorax mexicanus*, *Guara alba*, *Botaurus*, *Ardea*, *Nycticorax nycticorax naevius*, *Philohela*!, and *Ægialitis vocifera*; summer visitors — *Sterna antillarum*, *Ardetta*, *Herodias*, *Egretta*, *Hydranassa* (?), *Florida*, *Butorides*, *Ionornis*, *Gallinula*, and *Actitis*; winter visitors — *Pelecanus erythrorhynchos*, principal genera and species of Anatidæ, *Rallus* (except *crepitans* and *jamaicensis*), *Porzana*, *Fulica*, and *Gallinago*; transients — a large proportion of the Limicolæ.

The Falconidæ, except *Elanus*, *Ictinia*, *Buteo platypterus* (only in pinewoods towards the south), *Buteo lineatus alleni*, *Haliaeetus*, and *Pandion*, are either absent from the State in summer or are chiefly confined to the upland regions at that season.

The common Strigidæ occurring in Louisiana, *Asio* excepted, are chiefly resident and generally distributed.

Coccyzus americanus occurs in all sections in summer except unbroken pine forests.

The Picidæ are generally distributed at all seasons, except *Campephilus*, which is very rare, and found in heavy forests of the central and eastern sections; *Dryobates borealis*, which is confined to pine regions; and *Sphyrapicus*, which occurs as a winter visitor. *Melanerpes erythrocephalus* is commoner in summer, and somewhat partial to piney regions.

Antrostomus carolinus, common as summer visitor in heavy growths in pine or upland regions, is rare in the low fertile alluvial of the southeast.

The distribution of the Passeres will be more readily comprehended if considered in relation to the distribution of pine and hardwood growths.

Unbroken tracts of pine forest normally attract none but the following forms: Residents — *Corvus*, *Sturnella*, *Spizella socialis*, *Peucaea*, *Lanius*, *Dendroica virens*, *Sitta*, and *Sialia*; summer visitors — *Piranga rubra*; winter visitors — *Astragalinus*, *Spinus*, *Poocetes*, *Passerculus*, *Ammodramus henslowii*! (at least in long-leaf pine flats), *Dendroica coronata*, *Dendroica palmarum* and *Merula*; transients — *Dendroica virens*.

In point of species, omitting the few important exceptions already noted, the resident, summer visitor, and winter visitor classes of bird life in the State are mainly the same in all broad-leaved growths, whether forming unbroken forests as in parts of the east and southeast, or whether occurring as diversifications of the pine regions.

In point of comparative abundance of various species, however, there are great differences to be found in the several sections, as noted earlier in this résumé.

The occurrence of transients, as shown before, is most limited in the fertile alluvial of the southeast. The extremity of this condition is found in the typical swamps of cypress, red maple, tupelo, elm, and ash. In spring, especially, such country is practically unvisited by transients, except of the few species that breed there. Where the land and the growth have both been diversified by agriculture or through other means, the passage of transients is much more noticeable in this region. Furthermore, in both spring and fall, there are a few purely transient species that are found in striking abundance.

Attention is merely called again to these interesting conditions, which cannot be thoroughly understood without study of the annotated list to follow.

(To be continued.)

SOME BREEDING WARBLERS OF DEMAREST, N. J.

BY B. S. BOWDISH.

THIS paper is not put forward as a complete list of all the warblers that have bred around Demarest, for such a paper must needs be the result of many seasons painstaking observation. The present paper deals with such breeding evidence as has come under the necessarily limited observation of the author during the past three seasons.

The Black and White Warbler (*Mniotilta varia*) is a regular, though not abundant, summer resident. Aside from the presence of the birds in pairs during the breeding season, the evidence of its breeding depends on the record of a nest found by Miss Christabel M. Everett in the summer of 1901, and on a pair found by Mr. Abbott and the writer, June 17 last, accompanied by young a few days out of the nest.

The Blue-winged Warbler (*Helminthophila pinus*) is a quite abundant breeder, yet so successfully are the nests concealed, and so closely does the mother bird sit, that the nests are not often found. On June 11, 1904, a nest was found among the rank grass and weeds, in a bush- and weed-grown field, the bottom just above the ground. It was a frail structure, of fine stems and hair, and contained four young but a short time hatched. The female returned to the nest while the camera was within thirty inches of it. On May 12, of the present year, while passing a bushy point of woods jutting into a weed-grown field, I noticed a female Blue-winged Warbler with a dead oak leaf in her bill, and accompanied by her mate. After watching for a few minutes, without being able to track her to the prospective nest, I left, fearing to disturb her. I returned to the spot on the 15th and, without seeing the birds, I chanced quickly on the nest, built under a dead branch, near the base of a small cedar, and entirely covered with dead oak leaves, so laid as to leave only a mouse-like entrance. At this time no eggs had been laid, the nest seeming to be just newly finished. The first egg was laid on the 19th, and one egg added each day, the fifth and last egg being deposited May 23.

The eggs hatched June 2, the tenth day after deposition. On the 4th I found the nest empty, the leaf covering gone, and the parents crying about. A search finally discovered one young bird, still living, directly under the nest. I replaced him and he was cared for by the parents. He was still prospering on the 9th, and the nest being empty on the 14th, I hope he had so developed as to leave it of his own accord.

This mother bird, while incubating, returned to her eggs with the camera close to the nest. Operating with tube and bicycle pump, I made several exposures, and she posed quite motionless for exposures of 30 to 45 seconds, timed by watch. Young several days out of the nest were seen June 17, 1905.

The Yellow Warbler (*Dendroica aestiva*) is an abundant breeding species, arriving early in May, or even before, and departing in September. Here, as elsewhere, this bird seems partial to the bushes growing on or near the banks of streams, for nesting sites. It is exceedingly energetic, both as a larvæ destroyer and a songster.

The Chestnut-sided Warbler (*Dendroica pensylvanica*) is another of our abundant summer birds, and particularly endears itself to the observer by its devotion to nest and contents. June 4, 1904, a nest was found about two feet from the ground in a blackberry bush, at the edge of a wooded and bush-grown creek-bed. It contained four eggs, and even at the first visit, the mother bird would come on the nest while camera and operator were within two feet of it. On several subsequent occasions when I visited the nest, the bird showed the same solicitation for her charge and a growing confidence. June 5 of the present year, a nest was found, three feet up in a berry bush, in a slashing, containing four eggs. These eggs hatched June 14, and a day or two later the young disappeared. It was one of many tragic endings of attempts at house-keeping by the birds, observed this year. The female, while not as confiding as the bird of the previous year, was yet a brave little mother, and posed quite still, for exposures of fifteen seconds.

Black-throated Green Warbler (*Dendroica virens*). This is the one noteworthy record of a breeding warbler for this locality. June 5, 1904, while in a swampy piece of woods, a pair of these birds appeared much disturbed. They soon disappeared, and while still searching, I suddenly saw the female on the nest. The

situation of the nest was quite as much of a surprise as the finding of it in this locality. It was built between the stems of a 'skunk cabbage' plant, and fastened to a catbriar and the twigs of dead bush, and was about fourteen inches from the ground, in a very wet part of the swamp. It contained four eggs, which were fresh. The birds, while solicitous, did not, during our short stay, show the boldness and confidence displayed by the Chestnut-sided and Blue-winged Warblers, about their nests.

The Ovenbird (*Seiurus aurocapillus*) vies with the Yellow Warbler, in the matter of abundance, as many as three nests having been found in a single strip of woods. While allowing close approach to the nest when sitting, the bird seems exceedingly shy of a camera, and has proved one of the almost impossible subjects for photography. A set camera, well concealed, had the effect of keeping the bird from her nest until it was removed. A nest with four eggs was found June 6, 1904, built at the base of a small tree, in open woods. It was, however, destroyed before the young hatched. June 10, of the same year, two more nests were found in the same woods, one containing two eggs, the other four well fledged young. The last was under an open brush heap.

May 22 of the present year, I located a nest then building, near a path, in open woods. May 27, this nest contained three eggs, and the fourth and fifth were laid the 28th and 29th respectively. This bird incubated until the 14th of June, without results. On the latter date I found the nest destroyed. On June 18 a pair of birds was seen, accompanied by young as large as themselves.

The Northern Yellow-throat (*Geothlypis trichas brachidactyla*) appears to be quite as abundant as the Ovenbird. Swampy places where the 'skunk cabbage' grows are favorite nesting sites, the nest being often built among the stalks of this plant, though sometimes in tussocks of grass, and one nest, found this last summer, was in a tangle of dead 'joint grass,' well above the ground. All nests that I have found were in more or less wet places. For 1904 one nest with four fresh eggs was found June 2; another with four fresh eggs, June 5; and a third containing one egg, June 11. During the past summer the nest in the joint grass, previously referred to, was found June 5. It contained four fresh eggs, but was the subject of another of the summer tragedies that are so frequent, before the eggs hatched.

The Yellow-breasted Chat (*Icteria virens*) is a common breeder. Slashings and bush-grown fields, and creek-beds are the favorite sites. A nest containing three eggs was found May 29, 1904. May 24, 1905, I found a nest with four eggs, and another nest just completed. June 1 two of the eggs in the first nest were found to have hatched, the young being then several days old. On the 5th the nest was found to be empty, and the young may possibly have developed so rapidly as to have left of themselves. Another nest containing two eggs was found June 1. Two more eggs were added, and the bird was still sitting on unhatched eggs June 14. On the 19th the nest was empty and deserted.

Hooded Warbler (*Wilsonia mitrata*). Up to the present year I considered this warbler a rare breeder. June 5 a nest with four eggs was found, about one foot from the ground, in a small clump of bushes at the edge of a wood, close to a public road. June 17 and 18, Mr. Clinton G. Abbott and the writer found three pairs of birds with young out of the nest, within half a mile of the first nest. As the latter was destroyed without the eggs hatching, one cannot refrain from the impression that the birds, at least locally, must be fairly abundant breeders.

The American Redstart (*Setophaga ruticilla*) is fairly common, but only one nest has been located in the past three years. On June 3, 1904, a nest was found about ten feet from the ground, on a horizontal limb of an apple tree, beside a road, and a few feet from woods. It contained one egg. June 8 the nest was empty and deserted. A pair of birds with young, several days out of the nest, were seen June 18, of the present year.

In addition to the ten species enumerated, the Louisiana Water-Thrush (*Seiurus motacilla*) undoubtedly breeds regularly, though not abundantly, being frequently seen in pairs during the breeding season. Also there are a number of other species which it is reasonable to expect to breed here, and which I hope we may from time to time add to the list.

AUTUMN WARBLER HUNTING.

BY J. CLAIRE WOOD.

DESIRING to get some idea of the relative abundance of the late warblers and also to add a few to my collection, I spent September 25 and 28 and October 2, 1904, among them. Fourteen species, represented by 331 individuals, were met with. October 6 was the next date but I was only an hour in the woods. However, four species were noted represented by 11 birds. This was the last day I looked for them, but while woodcock hunting on October 16 I met with three Bay-breasted Warblers (*Dendroica castanea*) and three Black-polls (*D. striata*), and a Northern Yellow-throat (*Geothlypis trichas brachidactyla*) was flushed on October 23. This interested me in the question of how late any of the Mnioiltidae could be found here. Local and other lists of about the same latitude in the transition zone were consulted but the data were meager and somewhat unsatisfactory; in fact, no careful work seems to have been done this far north after early October. It became evident that the only way to get a proper idea of relative abundance and time of departure was to investigate personally. I began August 20, 1905, and started with the intention of devoting all my spare time to warbler hunting until the day came when no more were seen. This was not carried out, for the reason that it took seven hours to locate the single specimen observed October 26, and convinced me that the prospect of meeting with a later bird was not worth the trouble. Prior to October 1 my observations were restricted to a small piece of timber on P. C. 49, but when the warblers became scarce I included a large piece of second growth on P. C. 31, both in Ecorse Township, Wayne County, Michigan.

The fascination of warbler collecting is in not knowing what you will find. Locality and conditions influence the method of hunting. Silence dominates the woods here from late August until the third week in September. Now and then you hear the dreamy note of a Wood Pewee (*Contopus virens*) and the monotonous warble of a Red-eyed Vireo (*Vireo olivaceus*), or a crow may

caw, a jay scream, or a squirrel chatter, and then comes a long interval of silence, unless your ear has become trained to detect the warblers, which are more or less abundant in every woods of reasonable size at this time of year. As a rule the earlier birds are silent as they rest and feed among the branches but utter one or several distinct peeps as they fly from twig to twig or tree to tree. They are an active and restless lot, and it is easier to get their location and direction of travel than to see them in the thick foliage. Knowing the woods well, I seldom tried to detect them in the dense foliage of beeches, maples, and similar trees, but made sure of the course they were taking and went ahead to the first tree with few leaves. There are many butternut trees in the P. C. 49 woods and no bird can pass through one of these without discovery. One of the best places was a dead ash standing between some beeches and a maple covered with a thick growth of grape vines. When passing this point about half of the birds would pause in this tree, not long enough for positive identification but giving ample time for a quick shot. It is best to keep as much as possible along the leeward side of the woods, as the wind will convey sounds from a considerable distance. I was once fifty feet to windward of a large company and only discovered them by seeing a bird. It is surprising what a long distance a warbler can be seen when not under cover. Few birds are so active, and a quick motion instantly catches the eye. In hunting certain woodland birds I have been most successful by quietly remaining an hour or more in each favorable place but this does not apply to the warblers. You must keep constantly moving, with frequent pauses to listen and look around. Every flock of chickadees or kinglets should be examined for they attract many warblers but travel too slowly and the warblers soon disappear ahead. When I first started to collect, many birds were lost by waiting for a better shot. Later I shot at the flash of a wing or a suspicious movement among the leaves, but this is not a method to be recommended, as birds not wanted are frequently secured, especially the vireos. Only one Yellow-throated Vireo (*Vireo flavifrons*) came to grief, but the Red-eyes (*V. olivaceus*) were constantly getting into trouble. They were very common during September, and the last specimens were secured October 12 and 15. The Blue-headed Vireo (*V.*

solitarius) was taken September 28 and October 5, and last seen on October 8. The Philadelphia Vireo (*V. philadelphicus*) was taken September 3, 10 and 24. They were most abundant on the 7th, when five were seen. The last Rose-breasted Grosbeak (*Zamelodia ludoviciana*) and the Whip-poor-will (*Antrostomus vociferus*) were noted on October 5, and the Yellow-billed Cuckoo (*Coccyzus americanus*) October 8; but these birds may have remained later, as I looked for nothing except warblers.

The general direction of warbler migration was west to east until about September 20; then the reverse till October 5, and due south after that date. The earlier birds were not in a hurry and preferred to follow the chain of woods, but the southward impulse seemed so strong in the late ones that they disregarded convenience and pleasure. At no time did the wind tend to check the migratory movement although, like other birds, the warblers are averse to flying with it. On such days they merely traveled low and, after leaving the woods, took short flights, while at other times they usually crossed the open country without a stop.

Yellow Warbler (*Dendroica æstiva*).— On July 16 I noted a large company of adult females and junior birds traveling through the tree tops in the heavy timber; the course they were taking was close to S. 26° W. Only adult males were seen after late July, and they became scarce about August 10.

Tennessee Warbler (*Helminthophila peregrina*).— This warbler does not take the same route every autumn, nor for that matter every spring. Not even a straggler was seen in 1904, but it was the most common species this season from August 24 to September 10, when the Black-poll took the lead to September 24, and was replaced by the Myrtle Warbler from that date on. Both the Mourning Warbler (*Geothlypis philadelphia*) and the Nashville Warbler (*Helminthophila rubricapilla*) were met with in 1904.

Black-throated Blue Warbler (*Dendroica cerulescens*).— Single birds were more often met with than of any other species, and no other exhibited an equal amount of curiosity. One actually came down from the top of a tall elm to inspect me. This species was one of the few exceptions where only adult males were noted on the day of its first appearance. The October 15 birds were of both sexes and all ages, but the two later records were adult females.

The last specimen was secured by chance or rather by a combination of peculiar circumstances. Early in the day I had just reached a stump in the dense second growth when out popped a female Barred Owl (*Syrnium varium*) and started away, pounding the dead twigs into a spray. For hours I carefully investigated every flock of chickadees and kinglets and all likely places where solitary warblers might occur but without success. I had given up and was working out of the woods when a large flock of kinglets was heard. It required but a moment to get their direction and going ahead of them I hung the owl in a conspicuous place. It was soon surrounded by a dozen chickadees and more than a hundred Golden-crowned Kinglets (*Regulus satrapa*). Then came that chorus of ringing music, subdued and of rare sweetness, that kinglets make when surrounding an owl, and on one occasion when a Red-tailed Hawk (*Buteo borealis*) snuggled against the trunk of a thick beech in the heart of the woods during a pouring rain. While watching them the warbler appeared.

Myrtle Warbler. (*Dendroica coronata*).—Abundant September 28, and two or three hundred could be counted any day from October 1 to 15. Just how late the last of these warblers stay is not known but probably until the first heavy snow fall. The last day afield in 1904 was November 25, and twenty-five were counted—all in one flock.

Black-poll Warbler (*Dendroica striata*).—Next to the Myrtle, this was the most common species, but not in the woods. From about September 7 to October 9 this bird was seen every morning in the shade trees in the city on my way down town. As it is a great night traveler the electric lights were the probable attraction. Neither this species nor the Black-throated Green were present in such large numbers on any one day as in 1904, when about 125 of the former were noted on September 28, and 75 of the latter on October 2.

Palm Warbler (*Dendroica palmarum*).—This bird was alone and feeding in a hickory tree on high ground bordering a marsh. This is the only autumn record for the county, though it is common in spring.

Northern Yellow-throat (*Geothlypis trichas brachidactyla*).—This species may occur much later than noted by me, as I was not

in the right kind of territory. My specimens were found by beating the weeds bordering a roadway through the P. C. 49 woods.

The preceding list gives the date of the last summer residents and the number seen; also first and last date, with the number seen of the transient species, together with date of greatest abundance and the number; also everything noted after October 1 except the city Black-polls. As a bird in the hand is a positive record, beyond all possibility of dispute, a * indicates that one or more were taken on the date to which it is prefixed. I regret that the last Connecticut Warbler was not a positive record. I was resting in the thick undergrowth when the bird came directly toward me and alighted on a log not fifteen feet away. At that distance it would have been ruined for a specimen, and while I was trying to back away it took wing and disappeared.

STATUS AND PLUMAGES OF THE WHITE-WINGED
GULLS OF THE GENUS *LARUS*.

BY JONATHAN DWIGHT, JR., M. D.

Plate I.

IN NEARLY all of the many species of gulls so widely distributed in both hemispheres, the primaries are black variously patterned with white or gray, but there are several species, Arctic in their distribution, which may be set apart from the others by the whiteness or pale coloration of these feathers at all stages of plumage. The best known of these is the Glaucous Gull or Burgomaster (*Larus glaucus*), the adult of which is a large bird, snowy white except for the pale pearl-gray mantle, the color running over into the primaries and fading out to white towards their apices. This species is circumpolar, but Alaskan specimens, averaging a trifle smaller, have received a name, the Point Barrow Gull (*Larus barrovianus*). Confined chiefly to the Arctic regions lying between Spitzbergen and northern Canada is a small edition of the Burgomaster,—the Iceland or White-winged Gull (*Larus leucopterus*). Less Arctic in distribution and found breeding on the Pacific coast of North America, from the United States northward, is the medium-sized Glaucous-winged Gull (*Larus glaucescens*) which in a measure forms a connecting link between the white-primaried species just mentioned and those having black primaries with white spots. The mantle of this gull is much darker than that of *glaucus*, and the primaries are slaty with terminal white spots. Kumlien's Gull (*Larus kumlieni*) originally described from a specimen taken on Cumberland Sound, and Nelson's Gull (*Larus nelsoni*), taken in Alaska near St. Michaels, appear to be a small and a large edition of the same species, the latter being nearly the size of *glaucus*, the former about that of *leucopterus*. Unlike either of the two, however, the primaries of both *kumlieni* and *nelsoni* are more or less banded terminally or edged with slaty markings. The status of both is open to some doubt, for specimens are rare. Intergradation between them seems proba-

ble, and furthermore it is possible they may prove to be the connecting links between *glaucus* and *leucopterus* on the one hand and *glaucescens* on the other, but at present there is no evidence that they represent any stage of plumage of any of these three distinct species.

The material on which I have based my conclusions has been most extensive, including not only the series in the large collections of our own country, but I have also had opportunity for examining those in the British Museum, in the Rothschild Museum at Tring, and in the museum at Berlin. In spite of this large amount of available material, some 350 specimens in all, the great lack of proper sexing has proved a serious stumblingblock, and to overcome possible errors resulting from this cause, I have confined my measurements of adults almost wholly to birds taken in the breeding season. The number of labels bearing no sex mark or one that is obviously wrong is almost incredible, and among the gulls where the plumages of the sexes are alike, and females may be recognized only by their smaller size, the question of correct sex marks is of the greatest importance. In the large series examined, I found an unusual proportion of moulting birds that have been of the greatest value in tracing out the sequence of moults and plumages, although less serviceable for measurements of wings and tails.

Relative measurements are shown on the accompanying table which has been prepared by selecting, so far as possible, adult breeding birds and young birds taken so late in the fall and winter that they would be expected to have attained their full growth. It will be observed that except for their bills the young birds closely approximate to adult dimensions, and it is a well-known fact that the tarsi and toes of young gulls very quickly attain their full growth. It is of interest that *leucopterus* averages about 16 % and the bill 33 % smaller than *glaucus*, while *barrovianus* is scarcely 3 % smaller in size and 4 % smaller in bill. Now, the individual variation in any of the species under discussion amounts to more than 7 %, and it is doubtful if any two students measuring the same birds would come within 3 % of the same result. Furthermore, in *barrovianus* the character of bill—"which has the depth through the angle never less and usually decidedly greater

MEASUREMENTS. — *Males.*

[illegible]

than through the base"—on which the species was founded proves to be mythical. It is true that the largest specimens of *barrovianus* never quite reach the dimensions of the largest *glaucus*, but overlapping of size is so considerable, even when careful comparison of sexes is made, that without first reading the labels one cannot, except in a very few cases, tell whether a bird is from Greenland or from Alaska. The variation in the size and shape of the bill in gulls is very great, and a few millimeters difference in wings that are as long as one's arm is hardly ground on which to rest a subspecies, much less a full species. In view, therefore, of these facts, I would urge the removal of *barrovianus* from the North American list, the name becoming a synonym of *glaucus*.

Measurements, while dry, are instructive, although often positively misleading when derived from very small series. My table shows that the individual variation within each species is over 7 %. It also shows that *kumlieni* is the size of *leucopterus* with a bill 6 % larger, and *nelsoni* 16 % larger than *kumlieni* with a bill 24 % larger, a species, in fact, just about the size of *glaucus*.

Before discussing the plumages of the different species it may be well to draw attention to characters that are shared in common. Adults in breeding dress are white birds with white tails and with white tips to the flight-feathers, the gray of the mantles shading into the primaries, which are lighter in *glaucus* and *leucopterus*, darker in *glaucescens*, and have slaty markings in *kumlieni* and *nelsoni*; in winter the white heads and breasts are more or less clouded with smoky gray. The bills at all seasons are bright yellow with a vermilion red spot at the angle of the lower mandible, neither the yellow nor the red losing all its color even in old dried specimens. The legs and feet are flesh colored, drying to various shades of brown and yellow. The eyelids are yellow and the irides a pale yellow. Young birds are in general appearance pale brown and white, or gray, usually with a mottled or 'watered' effect, the primaries brown or gray, often white, and with no mottling or very little of it at the apices. The bills are brownish black paling to buff at the base. The legs and feet are flesh colored. The irides are brown.

I will not attempt to outline here the intermediate stages of plumage through which each species goes. Suffice it to say that

young birds at the limited postjuvenal moult in November or later reassume some mottled feathers, likewise at the prenuptial in March, and even at the first postnuptial in August there are often many evidences of immaturity that persist throughout a second year. The adults undergo a complete postnuptial moult in August or September and a partial prenuptial moult in March or April. The details of plumage and of moult may be better discussed under the separate species, and we may now turn at once to them.

***Larus glaucus.* GLAUCOUS GULL.**

This large circumpolar species breeds within the Arctic circle, moving southward in winter along the shores of both the Atlantic and the Pacific oceans, sometimes nearly half way to the equator. Knowledge of its plumages are derived from the material brought by Arctic expeditions and from winter specimens. I have examined an even 200 of these birds, over 50 of them from Alaska, the home of the so-called '*Larus barrovianus*,' the series also including over a dozen of the pure white phase known as '*Larus hutchinsii*,' probably the '*arcticus*' of earlier writers. The plumages of this species are too well known to require careful description, but the plumage changes in connection with the moults have never been thoroughly described. The sequence is as follows:

Natal Plumage.—The chicks are thickly covered with a soft, dingy white down with large brownish gray spots clouding the upper surface, especially about the head. Hatching in June, before July is spent, they are well advanced into the next plumage, the flight-feathers of which are among the first to appear.

Juvenal Plumage.—August or early September finds birds wholly in the brown barred or mottled plumage, of which the flight-feathers and the tail are retained for a full year, the body plumage and some of the lesser wing-coverts being partially renewed at two periods of moult, the postjuvenal in November or later and the prenuptial beginning often as early as the end of February. Birds may be found moulting at any time between October and May, and it may possibly turn out that but one moult takes place, but as the renewal of feathers is rather limited, and

as fall specimens always reassume brown feathers while late winter birds acquire much paler brown feathers usually mixed with white or gray ones, thus approaching the plumage of the adult, it is but logical to assume that some birds at least undergo a double moult during the first winter of their lives. In juvenal plumage the back and upper surface of the wings is dull white, the individual feathers coarsely barred and mottled with a pale buffy brown or drab-gray, giving a 'watered' effect, as if the color had run. The head, throat and neck are similar but paler, the brown in obscure streaks, and the lower parts are darker gray with indistinct clouding. The tail resembles the back but the mottlings are generally finer. There is considerable variation in the color of the primaries and secondaries of different specimens. They vary from pale ecru-drab, which tinges the yellowish white shafts, to dull white with straw-yellow shafts. There is usually a subapical dash or spot of brown, most conspicuous on the inner and often lacking on the outer primaries, especially if these be white. The first primary is usually palest on the outer web, and nearly all of them become paler toward their tips where occasionally an obscurely indicated white area may be found. The legs, feet and eyelids are flesh colored, becoming brownish ochre in the dried skin. The bill of very young birds is also largely flesh colored, later becoming bluish black at the tip beyond the nostril and drying in skins to a brownish black with the base dull buff-yellow. The iris is brown and, like the bill, remains of the same color for about a year.

First Winter Plumage.—Acquired by a partial postjuvinal moult. As explained earlier, this plumage does not appear to differ from the juvenal which it only partially supplants, chiefly on the back. The overlapping of the postjuvinal and prenuptial moults obscures the question of whether all young birds pass through one or two moults during their first winter, but the evidence is in favor of two. Before the time of the prenuptial arrives birds have faded out a good deal and are often quite white in appearance with the brown mottling very obscure. The paler of the drab primaries apparently fade to white in some cases.

First Nuptial Plumage.—Like many other species of the larger gulls *glauca* does not breed the first year and most of them remain in a brown plumage not materially different from the juvenal.

Some, however, at the prenuptial moult in March or April acquire to some extent white feathers about the head and body and a few pearl-gray ones on the back, but brown feathers are predominant, rather less distinctly mottled than those which preceded them.

Second Winter Plumage.— There is no dearth of moulting specimens taken during August and early September to show what changes take place at the postnuptial moult, but which birds illustrate the first and which the second (a year later) it is not so easy to determine. If the age of the different specimens could be known the matter would be simple, but it is probable that, as is the case with other species, the great majority of 'immature' plumages result from the first postnuptial moult. In *glauca* the variety of plumages appears to be considerable. In a very few birds brown mottled feathers still predominate, although birds with fairly developed gray mantles, white tails sprinkled with brown, and having pale ecru-drab or white primaries are perhaps the most usual type of plumage. The white heads and bodies are much obscured with smoky gray. An extreme is represented by birds absolutely pure white, the '*hutchinsii*' type. I was in error some years ago when I conjectured such birds to be old ones, for they are undoubtedly in a second year plumage, and moulting birds examined show the transition into it and also out of it at a later moult. Curiously enough, in some specimens new brown mottled feathers are succeeding to the white ones, both at the prenuptial and at the postnuptial moults, at the latter period pinkish drab primaries replacing snow white ones! Between the two extremes, the brown mottled and the white birds, every sort of variation may be found, and in some of the specimens examined, new brown, new white and new gray feathers (and even a triple mixture in single feathers) may be found growing side by side. It is evident therefore that not only does the vigor of individual birds vary, but the pigmentation of the feather germs of the individual varies to a considerable degree, possibly influenced by cold or food-supply. If white were the regular second year plumage there would be more of such specimens and not so many of tricolor plumage that certainly are suggestive of albinism on a large scale. Such white birds eventually assume normal gray plumage as specimens in moult clearly show. I am of opinion that nearly all of the 'imma-

ture' plumages are the result of the first postnuptial moult. The subapical spotting of the primaries betrays first year birds when it is present, but sometimes it is lacking. In second year birds it is, I believe, always lacking. Another earmark of first year birds is the dark bill. In second year birds it becomes more or less yellow with dusky bluish clouding, and the red spot usually does not develop till the second prenuptial moult has begun. The white birds have dark bills, which would indicate immaturity here as well as in plumage, and it will be noticed that, taken as a whole, the birds having the most yellow in the bill also have the most gray in their plumage, showing that both bill and feathers are equally influenced by whatever factor makes for maturity.

Second Nuptial Plumage.—The second prenuptial moult, at its height in April, is confined to the body feathers and a few of the lesser wing-coverts and scapulars. Gray, white, and brown feathers are regularly found. Some birds, except for wings and tail, are now like adults. The white birds acquire feathers of several colors, less often showing gray ones than do the browner birds.

Third Winter Plumage.—This plumage, acquired by the complete second postnuptial moult, appears to be that of the adult in the majority of cases. An occasional feather faintly sprinkled with brown may be found among the body or the tail feathers, but the adult primaries, pale pearl-gray like the mantle and fading to white a couple of inches from their apices, are now acquired for the first time. In still older adults the transition from gray to white on the primaries becomes more pronounced (as it always is on the secondaries and tertiaries) and the heads and bodies become pure white with scarcely a trace of the dusky clouding of younger birds. But here again the birds of the white type show a curious reversion to the juvenal condition of plumage for, as before stated, I have examined several that are exchanging white primaries for pale drab ones and white body feathers for brown mottled ones. On the other hand I have seen two others that are passing directly from white to gray. All of these specimens have the white wings and tails that are acquired at the first postnuptial moult and must therefore be two years old, for I do not believe a juvenal plumage could ever fade to the whiteness seen in these birds. I am forced to conclude, therefore, that white birds are a

year behind in their development, becoming white at the first postnuptial moult through deficiency of pigment, and assuming only at the second postnuptial a plumage that more vigorous birds acquire at the first postnuptial. From this it is evident that it is possible in a very few cases to confuse third winter with second winter birds, and this species illustrates well the difficulties that beset the study of plumages and moults.

It is further evident that only a small percentage of birds of this species fail to acquire adult plumage by their third winter while a good many of them possess the adult mantle and white body feathers of the adult during their second winter, off-color wings and tails alone marking them. It is impossible to estimate with any degree of accuracy what proportion of young birds at each successive moult pass to a more adult stage of plumage and what proportion reassume the feathers of adolescence, but it would seem that the time usually assigned for the attainment of adult plumage is exaggerated. Apparently, females are more backward in assuming mature feathers than are the males.

The sequence of plumages and moults here outlined obtains for all the species under consideration. There is reason, however, for believing that in the smaller species a larger proportion of the birds at the successive moults assume feathers characteristic of the adult than is the case in the larger species.

***Larus leucopterus.* WHITE-WINGED OR ICELAND GULL.**

This species is perhaps even more Arctic in distribution than *glaucus*, its breeding range extending from Spitzbergen westward to Greenland and the shores of Baffin's Bay. Thus it is associated throughout its range with *glaucus*, although seldom moving as far south in winter. Some sixty specimens have passed through my hands, and the sequence of moults and plumages is precisely the same as in the larger *glaucus* of which it is a small edition. There is, however, no overlapping of dimensions, for even the largest male fails to reach the size of the smallest female *glaucus*.

Specimens of adults are rare in collections, for I have found only fourteen in all. Young birds in juvenal plumage do not

differ from *glaucus*, as a rule, although the primaries more frequently have white or brownish shafts untinged with the yellow so prominent in *glaucus*. Some birds, too, are in the mottling perhaps more black and white rather than brownish. Second year birds more often have adult mantles than do second year *glaucus*, but the creamy or pinkish drab, or white primaries and brown mottled feathers in wings or tail betray their age. The white phase is also illustrated by two specimens, one in the collection of Mr. Everett Smith which is white except for a few pearl-gray feathers on the back, very pale drab primaries, and a few obscure mottlings on otherwise white feathers, and one in the American Museum which is pure white except for a small area of gray on the back. These are doubtless birds that have passed through the first postnuptial moult like '*hutchinsii*,' and the partly yellow bills support this assumption. They are probably the '*candidus*' and '*glacialis*' of early writers.

It should also be noted that in adults the mantle is rather darker than that of *glaucus*, although the color of each species varies somewhat in shade. In both of these gulls the gray is subject to considerable fading, and the transition from gray to white a couple of inches or so from the tips of the primaries is never abrupt.

***Larus glaucescens.* GLAUCOUS-WINGED GULL.**

While this medium-sized gull is not properly white-winged, I introduce it here for purposes of comparison. Its range is along the western coast of North America from the United States northward. In size it is a little larger than *leucopterus* with a much larger bill; in all plumages it differs radically from *glaucus* and *leucopterus*.

The *juvenal plumage* is deep plumbeous gray with broad dark barring or mottling and obscure whitish edgings. The tail is nearly solidly gray sprinkled basally with white, and the flight-feathers, including the quills, are also dark gray. The legs and feet are flesh-colored and the bill brownish black. Birds in this plumage are never so pale (especially the primaries) as the darkest *leucopterus*, nor are they ever so dark as the palest of the black-pri-

married species. They fade to a decidedly brown shade, almost mouse gray, but their color (especially that of the primaries) and the size of their bills even when young are cardinal points by which to recognize them.

The *first winter plumage* is like the juvenal, but at the prenuptial moult white about the head and body and gray on the back begins to appear in some specimens, thus marking the *first nuptial plumage*.

In the *second winter plumage* unpatterned drab or mouse-gray primaries are most frequent, together with the gray mantle of the adult. The white head and neck, as in the other species, are much clouded with dusky markings, which are lost at the next prenuptial moult. I do not think that primaries with the apical white spots of the adult bird are ever developed until a year later, but in some birds there is a foreshadowing of the white spot on the first primary. The *third winter plumage*, that of the adult, is the result of the second postnuptial moult, after which very few birds can be found showing traces of immaturity. The new primaries are slaty, and white-tipped, the first and sometimes the second with subapical or sometimes terminal white 'mirrors,' quite unlike the unpatterned feathers of *glaucus* or the smaller *leucopterus*. The mantle varies from cinereous to plumbeous gray, the color running over into the primaries, which become decidedly slaty towards their apices. The white of the head and neck is still clouded, the dusky markings being characteristic of winter plumages until the birds are quite advanced in age. At prenuptial moults, as in the other species, these feathers are replaced by white ones.

Larus kumlieni. KUMLIEN'S GULL.

Since this species was described in 1883 by Mr. Wm. Brewster nothing has been added to our knowledge of it save the recording of additional specimens. I have examined twenty-two of these birds, about a dozen in adult plumage, several in intermediate immature stages, and four in a plumage that I am convinced is the undescribed plumage of the young bird. This material shows

that adult *kumlien* is possessed of a character (the dusky subapical banding of the primaries) that neither *leucopterus* nor *glaucescens* have at any stage of plumage and therefore its right to rank as a species seems unimpeachable. The type locality is Cumberland Sound, where it breeds, and winter specimens have been taken chiefly along the Atlantic coast of Canada and the United States as far south as New York.

The plumages when taken up in their proper sequence are as follows:

The *natal down* is unknown as no chicks have as yet found their way into collections.

Juvenal Plumage.—Mr. L. Kumlien, who secured the type of the species at Cumberland Sound, mistook all the birds he saw for *glaucescens*, and speaks of the young as "even darker than the young of *L. argentatus*, the primaries and tail being *very nearly black*." This is not an accurate statement for although the birds are as dark as *glaucescens* in like plumage, they are not as dark as *argentatus*. The juvenal plumage may be described as follows:

Above, drab-gray mottled with dull white and obscurely barred and mottled with darker gray; below more solidly gray, paler about the head and throat. Flight-feathers a brownish gray, darker than the body, the outer webs of the primaries darkest. Tail almost solidly drab-gray, the basal portion and the outer pair of rectrices sprinkled with dull white; the upper and under tail-coverts, similar in color but with a good deal of blotching or barring. Bill "dusky," paling to buffy flesh-color at base. Legs and feet "flesh" (in dried specimen dull ochre). Iris "gray."

This description would fit any one of three birds, a male in the collection of Dr. Wm. C. Braislin, taken at Rockaway, New York, March 9, 1898, a female in the collection of Mr. Louis H. Porter, taken at Stamford, Conn., Feb. 16, 1894, and an unsexed (undoubtedly male) bird in my own collection obtained near Tadousac, Quebec, by an Indian during the winter of 1900-01, probably towards spring. They might easily pass for specimens of *glaucescens*, if it were not for the small bills and rather smaller dimensions. They are considerably darker (especially the primaries) than the darkest *leucopterus* I have seen, and the nearly solid gray of the

tail is a feature not seen in *leucopterus*. Besides this, the barring and mottling is much coarser and darker. In one of the birds there is a faintly indicated whitish subapical spot on the first primary, but similar spots may be found in other species of gulls and it seems to be a variable character of little importance. These specimens are perhaps not in full juvenal plumage, for they are probably partly in first winter dress, and two of them, just beginning the prenuptial moult, have acquired a few gray nuptial feathers of the mantle, but it must be remembered that the differences between juvenal and first winter plumages of the gulls are inappreciable. It is probable that the brown shade is due to fading and that earlier in the season these birds were grayer. They also bear quite a close resemblance to *L. californicus* in similar dress, but in this species the primaries are usually very much darker. In the young bird figured, Plate I (Collection of J. D., Jr., No. 7711, Tadousac, Que.) the wings, tail and part of the body plumage are juvenal, while some of the body feathers are doubtless the brown first winter with a sprinkling of the new first nuptial dress.

First Winter Plumage.—From what has just been said it has been made evident that this plumage differs in practically no respect from the juvenal. The postjuvenal moult is variable in the time of its occurrence, just as it is in all the gulls, and overlaps the prenuptial so as to be in many cases confused with it.

First Nuptial Plumage.—This plumage doubtless closely resembles the juvenal or the first winter, but birds may be expected to become whiter about the head and with a few gray feathers on the back.

Second Winter Plumage.—Like *leucopterus*, this species attains a considerable amount of adult plumage at this moult. The gray mantle, clouded white head and body and white tail indicate a close approximation to the adult plumage, but the primaries and other feathers of the wings are usually drab and not very much paler than in first winter birds. Dark gray or mottled feathers may also be found on the wings or tail or on the body posteriorly. The bills are yellow but often clouded and with the red spot lacking. The variation is considerable, just as in *glaucus* or *leucopterus* or *glaucescens*, but the darkness of flight-feathers or tail or of both combined is a character useful in sepa-

rating *kumlieni* from the two species last mentioned. The tail feathers, like those of *glaucescens*, while largely white may show gray patches, chiefly on the inner webs.

Second Nuptial Plumage.—The body plumage is renewed more or less at the second prenuptial moult, and I find evidence of this in several specimens, notably one in the collection of Mr. Wm. Brewster (No. 10052, Nova Scotia, March 8). Another bird in my own collection (No. 11577, Sable Island, Nova Scotia, March 19, 1903) is also moulting and is of particular interest because it is in a body plumage largely white, like the phase seen in both *glaucus* and *leucopterus*. The primaries of this bird are, however, quite dark brown, and there are other evidences of a faded brown mottled dress, so that it is probably a bird passing through the first prenuptial moult.

Third Winter Plumage.—Just as in the other gulls, this species after the second postnuptial moult assumes (except perhaps in a very few cases) the adult plumage, which is figured for the first time on the accompanying Plate I, by Mr. L. A. Fuertes, from an adult female in my collection (No. 9039, Sable Island, Nova Scotia, March 29, 1902). The text figure (Fig. 1) shows how this bird, *C*, differs in the pattern of the primaries from the type, *A* (U. S. Nat. Mus. No. 76225, Cumberland Sound, June 14, 1878), and I have also shown further variation in *B* (Coll. of E. Smith, No. 13631, Feb., Bay of Fundy) and in *D* (Coll. of E. A. & O. Bangs, No. 10709, ♀, Newfoundland, March 26). Mr. Brewster has so accurately described the type (Bull. N. O. C., VIII, 1883, p. 216) that no further description is necessary. We have in *kumlieni* a bird practically the size and color of *leucopterus*, but with slaty or brownish subterminal bars and shadings on several of the primaries, markings that neither *leucopterus* nor *glaucescens* ever have. The nearest approach to the former species may be found in a specimen (U. S. Nat. Mus. No. 161845, ♀, Baffinland, August) that lacks the bars but shows another distinctive character, to wit, a slaty outer web of the first primary to within a couple of inches of its apex. Dark markings also appear on the outer webs of the second and third primaries in this specimen. Adults therefore appear to vary from birds with bands on the second, third and fourth primaries to those in which the bands are more

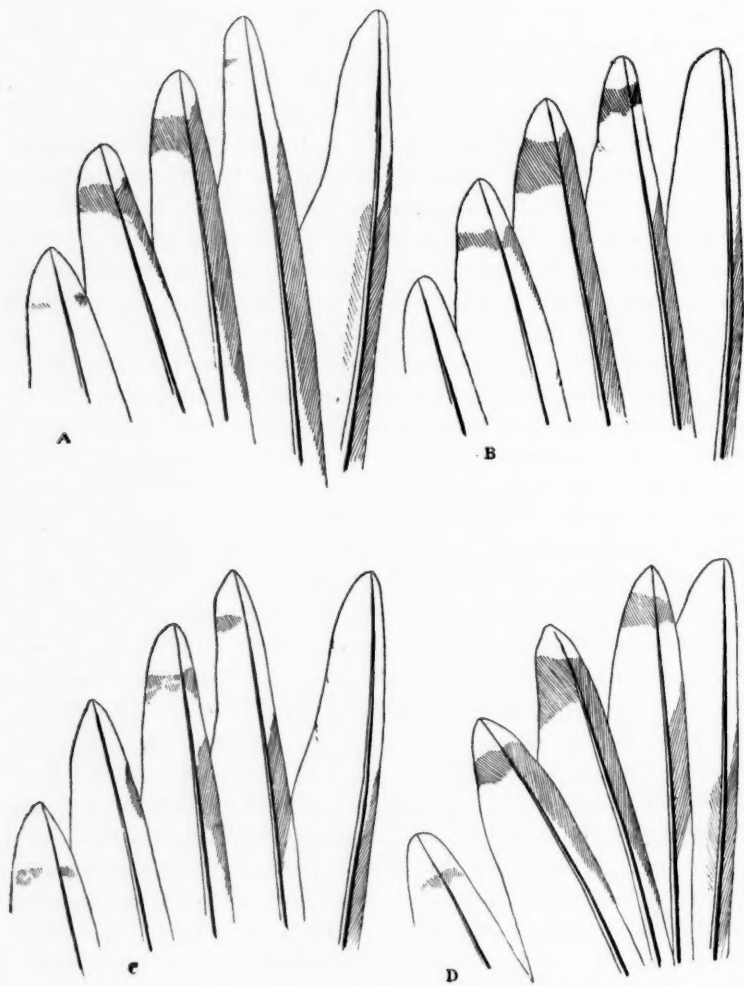


FIG. 1. VARIATIONS IN THE WING-PATTERN OF *Larus kumlieni*.

or less eliminated, but the slaty or brown edgings of the first and other primaries are always present.

Mr. Brewster has been in doubt whether the name *chalcopterus* might not be available for this species. The supposed type of Lichtenstein's bird is in the Berlin Museum where, through the courtesy of Dr. Anton Reichenow, I was permitted to examine it only last summer. It is No. 13583, a bird in juvenal or first winter plumage, darker than *glaucescens* ever is, and the primaries so nearly black that it is evidently the young of some species that has black primaries with white spots when adult,—possibly *L. californicus*. The dimensions best fit this species although the locality given is "Polar-meer," but at all events it is neither *leucopterus* nor *glaucescens*. Nor does Bruch's description of *chalcopterus* fit *kumlieni*, for the primaries do not have "round white terminal spots." Therefore Mr. Brewster was justified in giving a new name to a new species so rare that in twenty-two years only a like number of specimens have found their way into collections.

It is rather odd that *Larus leucopterus* in adult plumage from the Atlantic coast is almost unknown, the young birds being rather common, while in the same region adult *kumlieni* has been repeatedly captured and the young rarely. There is no doubt that both species will be found to be more abundant when they are diligently looked for. My specimen from Tadousac, Que., is I believe the first record of *kumlieni* for Quebec, and Mr. L. H. Porter's the first for Connecticut. There is also an unrecorded specimen, a young female taken at Plymouth, Mass., Jan. 5, 1888, in the museum at Tring, but with these exceptions most of the specimens are already on record. It may be well to note here that the type, at one time mounted and exposed to the light, has faded many shades lighter than are fresh birds.

***Larus nelsoni.* NELSON'S GULL.**

In 1884, Mr. H. W. Henshaw ventured to describe this species on the strength of a single breeding male from Alaska (U. S. Nat. Mus. No. 97253, ♂ St. Michaels, Alaska, June 20, 1880). Since then a specimen from Bering Straits has turned up in the

British Museum, another male from St. Michaels in the Acad. Nat. Sci. of Philadelphia (No. 37692, St. Michaels, Alaska, ♂ Sept. 5, 1897) and recently a fourth (Mus. Carnegie Inst. No. 7729, ♀, San Geronimo I., Lower California, March 18, 1897) which is apparently a nearly adult female has been taken at a surprisingly southern locality. I have examined all of these four birds and find that the type, the specimen in the British Museum, and the bird in the Philadelphia Academy are very similar, and the pattern of the primaries corresponds very nearly to the type specimen of *kumlieni*, the outer webs being slaty or brownish but the terminal bands much less distinct. The Carnegie specimen, on the other hand, is nearly the counterpart of the U. S. Nat. Mus. specimen of *kumlieni* (No. 161845) described above; there is no banding, but merely dusky outer webs of the primaries. Doubtless in time other specimens will be obtained, but judging from the few extant, *nelsoni* seems to have as good a claim for specific distinctness as does *kumlieni*, of which it appears to be a large edition. It is a species about the size of *glaucus* and as much larger than *kumlieni*, 16 %, as *glaucus* is larger than *leucop-terus*. The bill, however, seems to be only about 24 % larger, but with tarsi and toes relatively very large.

The young bird has never been described, but inasmuch as *kumlieni* in juvenal plumage is scarcely to be distinguished from *glaucescens*, there is every reason for expecting the corresponding plumage of *nelsoni* to be practically the same. The birds, though, ought to be larger than *glaucescens* and I have no doubt that very large specimens now labelled '*glaucescens*' in various collections will eventually prove to be *nelsoni*. Such a bird has been recorded in the British Museum Catalogue, but somehow I overlooked it when examining the collection. In the American Museum, however, I find two specimens (Nos. 26234 and 61536) so much larger than *glaucescens* usually is that I believe them to be *nelsoni*. The tarsi and feet are unusually large and massive and the bills very heavy. The bird in the Philadelphia Academy is completing an adult postnuptial moult, but the other specimens throw very little light on the subject of moult in this species.

While I may not have been entirely successful in untangling the confusing multitude of so-called immature plumages in these spe-

cies, I have at least shown the way to complete success. To call a plumage merely "immature" is to confess we do not know much about it. Each of the species under consideration has no less than five plumages that may be called "immature," the juvenal, the first winter, the first nuptial, the second winter and the second nuptial, and in a few exceptional cases we may add the third winter and the third nuptial, making seven. Even the large amount of material I have examined does not make every one of these plumages perfectly clear, but it is only by the comparison of comparable plumages that we shall ever arrive at the desired goal. There is a large portion of Arctic America still unexplored, and with other material it may some day be necessary to revise in part my present conclusions.

My work has been prosecuted at intervals during several years but I trust it has lost nothing by being so long delayed.

I am indebted to many institutions and individuals for courtesies and for the loan of specimens, particularly to Dr. Sharpe and Mr. Grant of the British Museum; to Mr. Hartert of the Rothschild Museum at Tring; to Dr. Reichenow of the Berlin museum; to Mr. Ridgway and Dr. Richmond of the U. S. Nat. Museum; Mr. Nelson of the Biological Survey; to Dr. Allen and Mr. Chapman of the American Museum of Natural History; to Mr. Stone of the Philadelphia Academy of Natural Sciences; and to the following private collectors, viz. Mr. O. Bangs, Mr. C. F. Batchelder, Dr. L. B. Bishop, Mr. Wm. Brewster, Dr. Wm. C. Braislin, Mr. R. W. Peavey, Mr. L. H. Porter, and Mr. Everett Smith.

NOTES ON THE WINTER BIRDS OF HANCOCK
COUNTY, MISSISSIPPI.

BY ANDREW ALLISON.

BELIEVING that a series of local list will be a good prelude to a published list of the avifauna of Mississippi—"one of our best neglected States," an ornithologist of experience has called it—I have thought it advisable to put forward the following few remarks on the winter birds of Hancock County; more especially as the coast region of this State seems to be even less known than the interior.

Hancock is the most western of the three coastal counties of Mississippi. Its western border is Pearl River, and extensive salt meadows cover much of that part. The county seat, Bay St. Louis, is on the eastern border; and here the marshes are smaller, and low hills and flat pine barrens are the salient features. This town served as the base of operations for the four-day trip resulting in the records that follow.

The hills, as well as the flat lands, are more or less pine-clad; but oaks—*Quercus falcata*, *Q. stellata parvifolia*, *Q. aquatica*, *Q. laurifolia*, *Q. nigra*, and *Q. cinerea*—are very important; the live oak (*Q. virens*) is chiefly restricted to those hills bordering the bay from which the town takes its name. *Hicoria tomentosa*, *Magnolia fatida*, and *Oxydendron arboreum* are also common upland trees; the pine barrens are covered with the gall-berry (*Ilex glabra*); and *Callicarpa americana*—the 'Spanish mulberry'—is the most important of the dry-ground shrubs.

Between these hills are sluggish streams, draining into the marshes of the bay; in the low, wet, areas along these streams grow *Magnolia glauca*, *Nyssa biflora*—which also spreads farther up the hillside,—*Cyrilla racemiflora*, and *Cliftonia ligustrina*. Several species of *Smilax* climb over these trees; and of shrubs there are *Azalea nudiflora et viscosa*, *Vaccinium elliottii*, and, most important of all, the anise or rose-bay (*Illicium floridanum*). *Salix longifolia* occurs in more open places, and *Acer rubrum* is also common. These strips of low wet woods are called 'bay-galls.'

Where these streams empty out into the marshes, there are heavy swales of saw-grass (*Cladium effusum*); but the typical 'marsh grass' is *Juncus roemerianus*. Where pools occur in the marsh, there are *Sagittaria lancifolia* and *Pontederia cordata*.

The following observations were made by Messrs. H. H. Kopman, W. B. Allison, and the writer, February 13-16, 1904.

1. **Podilymbus podiceps**. PIED-BILLED GREBE.—Two seen in the Bay near its head, where Jordan River empties into it.
2. **Larus delawarensis**. RING-BILLED GULL.—Common.
3. **Larus argentatus**. HERRING GULL.—Common; one was picked up dead, though unwounded, on Feb. 14.
4. **Larus atricilla**. LAUGHING GULL.—Few seen.
5. **Ardea herodias**. GREAT BLUE HERON.—One seen in the Jordan River marsh.
6. **Rallus elegans**. KING RAIL.—Common, but inconspicuous.
7. **Oxyechus vociferus**. KILLDEER.—Not uncommon on the beach.
8. **Ægialitis semipalmata**. SEMIPALMATED PLOVER.—A few were seen in company with Killdeers, Feb. 13. This is our first winter record.
9. **Zenaidura macroura**. MOURNING DOVE.—One only.
10. **Cathartes aura**. TURKEY VULTURE.—Common.
11. **Catharista urubu**. BLACK VULTURE.—Common; the two species do not mix much.
12. **Buteo borealis**. RED-TAILED HAWK.—A large hawk seen at a distance on Feb. 16 must have been of this species.
13. **Falco sparverius**. AMERICAN SPARROW HAWK.—Not common.
14. **Syrnium varium**. BARRED OWL.—One only.
15. **Dryobates villosus audubonii**. SOUTHERN HAIRY WOODPECKER.—A few.
16. **Dryobates pubescens**. DOWNY WOODPECKER.—Uncommon.
17. **Dryobates borealis**. RED-COCKADED WOODPECKER.—Common in the pine barrens.
18. **Centurus carolinus**. RED-BELLIED WOODPECKER.—A few.
19. **Melanerpes erythrocephalus**. RED-HEADED WOODPECKER.—Two or three in the pine woods.
20. **Colaptes auratus**. FLICKER.—Common; mostly in small flocks.
21. **Sayornis phoebe**. PHOEBE.—Common.
22. **Cyanocitta cristata**. BLUE JAY.—Common.
23. **Corvus brachyrhynchos**. AMERICAN CROW.—Very common.
24. **Corvus ossifragus**. FISH CROW.—Common.
25. **Agelaius phoeniceus floridanus**. FLORIDA RED-WINGED BLACK-BIRD.—Rather common in flocks.
26. **Euphagus carolinus**. RUSTY GRACKLE.—One flock, in a pine clearing.

27. *Quiscalus quiscula aglæus*. FLORIDA GRACKLE.— A few.
28. *Megaquiscalus major*. BOAT-TAILED GRACKLE.— Fairly common on the beach and in the marshes.
29. *Astragalinus tristis*. AMERICAN GOLDFINCH.— Rather common, in medium-sized flocks among deciduous trees.
[*Spinus pinus*. PINE SISKIN?— Doubtful; a flock of supposed Siskins seen Feb. 13.]
30. *Poocetes gramineus*. VESPER SPARROW.— Rather common in the clearing; in song.
31. *Passerculus sandwichensis savanna*. SAVANNA SPARROW.— Sparingly present in the extensive clearings.
32. *Zonotrichia albicollis*. WHITE-THROATED SPARROW.— Locally common in thickets.
33. *Chondestes grammacus*. LARK SPARROW.— We found this species in the pine clearings, about equally common with the Vesper Sparrow, and in song. Up to this time we had found it only very rarely.
34. *Spizella socialis*. CHIPPING SPARROW.— Very common in large flocks in the pine clearings; a good many in the town.
35. *Melospiza georgiana*. SWAMP SPARROW.— Common in suitable situations.
36. *Pipilo erythrophthalmus*. TOWHEE.— Only a few.
37. *Cardinalis cardinalis*. CARDINAL.— Rare! This is hardly normal, though it is never as common here as is *C. c. magnirostris* in lower Louisiana.
- (38. *Progne subis*. PURPLE MARTIN.— A spring bird, of course, and so hardly in keeping in this list; a few were present, being seen and heard nearly every day of the trip.)
39. *Lanius ludovicianus*. LOGGERHEAD SHRIKE.— Common; the small size of the resident pine woods form was noticeable.
40. *Ampelis cedrorum*. CEDAR WAXWING.— Only a few heard.
41. *Helminthophila celata*. ORANGE-CROWNED WARBLER.— Conspicuous when present, and not at all uncommon in the deciduous woods, though always single.
42. *Dendroica coronata*. MYRTLE WARBLER.— Very common, and ubiquitous; present even on the sandy beach.
43. *Dendroica vigosii*. PINE WARBLER.— Very common, singing often.
44. *Dendroica palmarum hypochrysea*. YELLOW PALM WARBLER.— Common; always more or less gregarious, and associated with the preceding.
45. *Geothlypis trichas ignota*. FLORIDA YELLOWTHROAT.— Two heard.
46. *Anthus pensilvanicus*. AMERICAN PIPIT.— Not common; on the beach and in cultivated lands.
47. *Mimus polyglottos*. MOCKINGBIRD.— Common; many in song.
48. *Toxostoma rufum*. BROWN THRASHER.— Noted only twice.

49. **Thryothorus ludovicianus.** CAROLINA WREN.— Very common.
50. **Thryomanes bewickii.** BEWICK'S WREN.— Noted twice.
51. **Troglodytes aëdon.** HOUSE WREN.— Not common.
52. **Cistothorus stellaris.** SHORT-BILLED MARSH WREN.— Not uncommon.
53. **Sitta carolinensis.** WHITE-BREASTED NUTHATCH.— Very conspicuous; we saw it in company with Bluebirds and Pine and Yellow Palm Warblers, even feeding with them on the ground, in one instance.
54. **Sitta pusilla.** BROWN-HEADED NUTHATCH.— Abundant among the pines.
55. **Bæolophus bicolor.** TUFTED TITMOUSE.— Very common.
56. **Parus carolinensis.** CAROLINA CHICKADEE.— Common.
57. **Regulus satrapa.** GOLDEN-CROWNED KINGLET.— Common; the characteristic kinglet of the conifers.
58. **Regulus calendula.** RUBY-CROWNED KINGLET.— Less common than the preceding.
59. **Hylocichla aonalaschkæ pallasii.** HERMIT THRUSH.— Common in low thickets; almost unknown here for a few years after the snow of 1895, this bird has again become as common as ever.
60. **Merula migratoria.** AMERICAN ROBIN.— Over great tracts of young pine, cleared land, and burnt forest, we often walked, seeing hardly any birds but these; they flushed before us at almost every step, and soon became an important feature of the landscape.
61. **Sialia sialis.** BLUEBIRD.— Very common, and in fine song.

NOTES ON THE SCREECH OWL.

BY P. T. COOLIDGE.

I.—A YOUNG SCREECH OWL IN CAPTIVITY.

ON June 5, 1902, I obtained a young Screech Owl (*Megascops asio*), which had been found two or three days before in a road in Cambridge, Mass. A brief description of the bird at the beginning of its period of captivity will give some idea of its age. Its total length was about seven inches, of which about one inch was tail. The whole plumage was remarkably soft and fur-like; the facial disk was not very clearly defined, and the ears were merely certain areas in the scalp plumage the feathers of which could be erected at will. At the end of the first week of captivity, the owl could fly well. Before acquiring this accomplishment, when put in some position of precarious footing, like the slippery arm of a chair, he could move most easily by crawling, sometimes clinging with his bill parrot-fashion. On the floor he would patter away as nimbly as a sandpiper.

The first evening he was as tame as a hungry robin nestling. He would perch willingly on one's finger, and would allow himself to be stroked. But when he first saw me the next morning, his gentleness had all disappeared. Hissing, and snapping his bill, he swayed from one foot to the other, and held his wings off from his sides and ruffled his feathers so that he was fully six inches wide. His hiss, in particular, was about as terrifying as a gentle puff from an empty atomizer. This performance was repeated but once or twice during the eleven weeks of his imprisonment with me. Thinking the bird might be hungry, as he had been given nothing the night before, I tried as soon as possible to feed him with liver. He protested much, by a rather musical chattering, especially at my attempts to force morsels down his throat.

The cage which the owl occupied during the summer was a box eighteen inches high, twenty-five inches long, and twenty-two inches wide, one side of which was covered with "cellar window

wire." This box was placed facing north on a piazza. The owl did not like to be in the sunlight except towards dusk, but he always perched near the front of the cage where he could see what was going on. During the daytime he was always quiet unless his interest was aroused by something, when his head would swing as violently as the exciting object warranted. This habit of swinging the head was his most striking trait. His head was almost always moving, either from side to side horizontally, or around in a vertical and side to side circle, the eyes generally focused with a stare on one thing or another. If he became excited, this head motion was communicated to his whole body. The circle which his head then described would reach from the point of his greatest stature to the level of his perch. The head swinging was not without interruption, being broken by frequent intervals of a few seconds each of steady staring, or when things were quiet and the owl had become accustomed to his surroundings, by much longer periods of comparative stillness. This habit was noted in his Barred Owls by Frank Bolles. My owl occasionally acted at sight of a person as a wild Screech Owl does, that is, he would stiffen and would move his head only enough to keep an eye on the intruder, and he always behaved thus at sight of a cat or of a dog. After a preliminary grunt, 'urrrh,' omitted however if the intruder were human, he would draw his plumage close to his body, move his tightly closed wings back slightly, erect his ears, and half close his eyes. The reason for such behavior on one occasion at sight of a distant gray squirrel invites speculation. If a cat or a dog came too near, the owl would generally try to fly.

The quiet of the day was broken shortly after sunset by his beginning to jump back and forth from perch to perch, and to swing his head excitedly. Presently he would try to escape, either by starting to fly directly from his perch or by climbing about the wire netting and beating his wings against it: or he would give vent to his feelings by tearing the papers which were spread on the floor of the cage. This performance was repeated many times every evening. He raised a large scab on his cere by bumping it against the wiring. If food were offered him at this time, he would be too excited to notice it, but by eight or nine o'clock he would be more quiet and more hungry. If during this evening

performance anything were held before him so that he could not see out, he would side-step rapidly along his perch until he found an opening. Indoors on his first day with me, he slept whenever the room was quiet; I never discovered him asleep again, although he often looked drowsy in the daytime, and if he slept, it must have occurred late at night or in the early morning.

His principal diet was raw beef, which cut into pieces the size of the end of one's finger, was fed to him by hand. He would eat meat that was not only luminous but so foul as to be unpleasant to prepare for him. Although he was not urged to learn that beef placed in his cage was good to eat, it took him some time to discover the fact. Besides beef, he ate mice, liver, birds, frogs, perch, June bugs, and earthworms: caterpillars he would not eat, and also, unlike another pet Screech Owl of which I heard, he would eat neither bread nor shredded wheat. He ate eagerly in the morning, taking a large amount of food in one meal, but would refuse to eat more until afternoon, or very often until evening. When food was offered him, if hungry, he would take it in his bill, and if the morsel were small enough, would swallow it at once. If too large for immediate swallowing, he would transfer it to his claw and jump to the floor of the cage. June bugs were generally picked to pieces on the perch. After a thorough biting and pulling of its head, ears, skin, legs, and tail, a dead mouse would be swallowed whole, head first. An eight inch owl gagged with a three inch mouse was a sight more suggestive of pain than of enjoyment; sometimes the mouse's tail would refuse to be swallowed immediately, and might dangle from the owl's bill for a minute or more before disappearing within. Birds, unless small, as nestling English sparrows, were eaten differently from mice. Generally the head and the abdomen were torn to pieces and eaten first, the owl standing on the food with both feet, and with his bill jerking off morsels to be swallowed; the remainder of the bird was sometimes eaten and sometimes abandoned. The owl never troubled himself to kill a bird outright. Pieces of beef too large for instant swallowing, were torn to pieces like birds. If the owl did not care for food which he was thus preparing, he would back away from it a few steps, stretch up to his full height, and look down at it with a most comical expression and attitude.

During the course of a day in which a mouse, bird or June bug had been eaten, the indigestible parts, as fur, feathers, bones, wing-scales, were thrown up in a pellet.

Although there was always a dish of water in the cage, I saw the owl drink but once,— just after he had been taken out into the sunshine and had been made furious by much handling. From his somewhat bedraggled appearance on many mornings, I judged that the owl often bathed at night. One noon, also, shortly after an experience similar to that which caused him to drink, the wetness of his plumage showed that he had bathed.

Besides the calls already mentioned, there were others. Sometimes on one's going to his cage in the evening the owl would give once what sounded like that part of the usual Screech Owl call in which the quavering voice is kept at one note. When hungry, he whined, in a high key, faintly and hoarsely. One evening he gave a call which sounded something like, *Yuck, yuck, yuck, yuck*, the "yucks" at about the same rate as the notes of a flicker's long "laugh."

The pity for blindness expressed by most who saw the owl by daylight was undoubtedly wasted. He would watch crows several hundred yards away, and if an ant or other insect strayed into the cage, he was sure to watch it intently. Taken into direct sunlight, he generally stiffened slightly and blinked, but as he always did this at sight of a foe, it does not indicate that the light pained his eyes. In the sunlight he often panted, seeming to suffer more from heat than from light. Anyone who has seen Screech Owls in the field knows that it is as hard to stalk them from the sunny side as from the shady. At the sight of his image in a mirror, he showed surprisingly little excitement.

For the purpose of using my owl as a decoy, it was my custom to tie him by one leg with a short string to a stick, an undertaking which always produced a struggle, in which, and only in which, he would bite uncomfortably. For success in attracting birds, it was necessary to draw the attention of Robins or Chickadees to the owl, for only they would give a general alarm. This accomplished, other birds would join in the "rough-house." Besides Robins and Chickadees, I noted Orioles, Chipping Sparrows, and various species of warblers and vireos. A longer list would

doubtless have been obtained by further experiment. The birds scolded the owl harshly with their usual calls, but they often disappeared shortly, leaving the field to the Chickadees and Robins, which never tired of abusing him. The most vehement bird was a Wood Thrush, which dashed back and forth, passing so close to his head that he snapped savagely in defense at each attack. Blue Jays, even when I was at a distance, seemed to pay no attention to the scolding of the smaller birds. Scarlet Tanagers, and also to my surprise, Kingbirds and Flickers, refused to be interested. The owl watched his slanderers sharply and steadily. A pair of young Broad-winged Hawks, although of the usual tameness of the species, seemed to ignore the owl, which stiffened on seeing them against the sky, but failed to see them among trees.

To mounted birds my owl paid no attention unless they were moved. A mounted crow gave him much misery. When he first saw the crow moved, he would stiffen and erect his ears; then, as the crow was brought nearer he would fly unless cornered. In such strait he would order the crow to keep away by snapping his bill, ruffling himself into a mass of bristling feathers, from which would glare two fiery, blinking eyes, and most characteristically by giving a long-drawn *oooo*, in the voice of the "Hoot" Owl. His throat would swell much with this call. If the crow became too lively, the owl would fly, aiming first at the crow's head and then passing on. If the crow were made to peck him, he would snap his bill sharply, but would do nothing more.

Moulting, which was first noticeable on July 31, gave the bird his adult plumage and showed him to be of the gray phase. As the old feathers became more and more thin and shabby, the bright, compact, new plumage showed through, on the under parts first. The moulting was not entirely complete when I last saw him on August 21.

Though the owl showed intelligence in some ways, the fiercer qualities of a bird of prey remained unchanged. He was as ready to scold at one's approach, to bite if handled, and to escape at night on the last day of his captivity as on the first. In the daytime, if one approached his cage so slowly as not to ruffle his feelings, he would watch from his sleepy eyes, now and then swinging his head a little, so drowsily as to seem well-disposed. When

in an agreeable mood, he would allow his head to be stroked, but if the finger went too far down his back or touched his breast, the threatening bill opened. Sometimes, taking my finger in his claw, he would bite it gently all over, as if trying to discover its properties.

The owl is much more like other birds than may be generally supposed. My pet lacked the constraint and the desire to hide which wild owls usually show in one's presence, and accordingly his body was generally relaxed and tilted forward like that of a song bird. When quiet the owl perched on one foot and curled the other away under his feathers. Again, like other birds, he spent much time in preening. The fact that in captivity he could exercise very little may account for his occasionally stretching first one wing and then the other to its full extent downward behind him, and at the same time rising on his feet to his full height. Sometimes he raised his wings above his back and shook them. His disposition was stoical as to sounds: he would pay no attention to whistles, squeaks, or banging on the cage. One's movements were watched with great alertness, however, and if they were sudden, he would sometimes start.

My owl was released by a friend on September 15 of the same year: he seemed to be unwell at the time. During his three months' captivity he learned to trust people so that although he was ever ready to scold or bite, he would not seek concealment or flight at their approach. But except for this partial trustfulness, my pet was probably but little different in instincts from the owl that had always been free.

II.—MATING OF THE SCREECH OWL.

Visits at sunset in the spring of 1903 to the residence of a pair of Screech Owls near Cambridge disclosed the nature of their mating. The owl's dwelling was a hole about a foot in diameter and about twenty feet from the ground in a large elm. After my discovery of the tree in February, 1900, it was inhabited by a gray screech owl every winter until that of 1904-1905. As the bird's habits remained unchanged, and as it came and went at the same seasons, it is probable that the same gray screech owl

occupied the tree each winter. From the doings of the pair in mating, as will presently be described, I judge that this bird was the female. In 1900, 1901, and 1903, about the middle of March, a red owl joined the gray one for two or three weeks in her watch at the entrance of the cavity, the two birds sitting side by side. At the approach of a person the owls backed down out of sight into the depths of their hole, more promptly in the daytime than in the dusk, more promptly if one's approach were directly towards the tree than if otherwise, and the gray bird sooner than the red one. They returned to the entrance with promptness inversely proportional to their willingness to withdraw, the gray bird at noon not for perhaps fifteen or twenty minutes, the red one towards sunset in less than a minute.

The hour of the owls' movements was controlled by the degree of darkness. Hence on cloudy evenings the various events occurred rather earlier by the clock than at the hours given below, which apply to clear evenings. By watching at the foot of the owl tree, I found that the gray owl began her night's hunting, whether the red owl were present or not, about forty minutes after sunset. The gray owl was a little suspicious even in the dusk, any sudden or unusual movement causing her to retire for a few minutes. But the red owl in the dusk would not retreat under any provocation, although until a few minutes after sunset he would sit rather quietly, with plumage drawn tightly against his body, and ears erect. As the darkness increased his attitude relaxed: he would ruffle his plumage, scratch his head, and look about, into the distance, or down into the hole in which the female was hiding, or at me on the grass below. About ten or eleven minutes after sunset he left the tree and began singing his love song: he was now full of life and ignored all disturbance. His song was in B flat of the middle octave, a soft trill, seemingly far away, two or three seconds long, and closing with an upward inflection, as if the bird were asking a question,—as doubtless he was. Until the flight of the female, he sang from various perches, now from the branches of the elm, now from some neighboring tree, now from the rim of the cavity in the elm, his eyes fastened upon his quiet mate. His handsome head was continually bobbing and swinging. Once in a while the male would

light beside her; flashing of wings would follow, but the darkness made more exact analysis of their movements impossible. Occasionally he would fly out of sight. Returning from one of these trips he lighted upon the rim of the cavity and touched his bill to that of his mate, but whether to give her some tidbit, or merely a greeting, the darkness kept secret. Hoping to make the gray owl fly and to see by her silhouette if she had food in her bill, I threw sticks at her, but instead of flying she retired for a few minutes into her chamber. By the time the female flew, the darkness made it difficult to see the owls at all. The male disappeared at the same time, and although on the two evenings on which I saw the love-making, March 29 and April 5, I waited about ten minutes longer, nothing happened and the place seemed deserted. Whether or not the red owl followed the gray one in her hunting, and what took place at the tree later in the night must be left to the imagination.

On account of the exposed situation of the owl castle, I never risked the disclosure of the secret to greedy eyes by climbing up to examine its interior. However, as the gray owl was never seen from the first week in April until the following autumn, and as no young were ever seen at or near the tree, the nesting more probably took place elsewhere, the tree under observation being only the winter quarters of the female. The red owl was not seen after the second week in April, except in 1903, when he apparently lived alone at the tree until the last week in May.

In the spring of 1904 no mate joined the gray owl at the tree. It would be interesting to know whether she advertised herself as a gay widow, or whether a mate found her in spite of her demure ways, but notwithstanding frequent visits she was not seen after the evening of March 24, 1904, and it is probable that the eyrie is of the past.

A CONTRIBUTION TO THE ORNITHOLOGY OF
SOUTH CAROLINA, CHIEFLY THE
COAST REGION.

BY ARTHUR T. WAYNE.

Podilymbus podiceps. PIED-BILLED GREBE.—An abundant resident, breeding in freshwater ponds or large rice field 'back-waters' where the water is generally from four to ten feet deep. The number of eggs ranges from six to eight, and incubation begins as early as the first week in April in some forward seasons. After the breeding season is over both young and adult betake themselves to the salt water creeks,—very rarely going as far as the inlets. During the breeding season, the principle food of this species is leeches.

Anas obscura rubripes. RED-LEGGED BLACK DUCK.—A common winter and early spring resident; arriving the last week in November and remaining until the last week in March. It is always outnumbered by *obscura*, and examples of both forms are commonly shot from the same flock. Professional gunners make no distinction between the two forms—*rubripes* being considered the *very* adult of *Anas obscura*.

Tantalus loculator. WOOD IBIS.—A few individuals *winter* regularly as far north as Lat. 33°. From the middle of June until the last of October, enormous flocks, composed entirely of *young* birds, are to be seen daily on the sound in front of my house. At times the Wood Ibis is very unsuspicious and confiding. I have seen one of these birds deliberately follow a boat as long as fish were being thrown to it, one at a time, which the ibis devoured ravenously. This species breeds in some numbers in Caw-Caw swamp, Colleton County.

Botaurus lentiginosus. AMERICAN BITTERN.—During the months of May, June, and July, 1887, I saw several pairs of these birds in an enormous 'back-water' near Yemassee, S. C., where the Purple Gallinule (*Ionornis martinica*) was breeding in large numbers, but despite all my exertions I was unable to find a nest, although the young birds were seen in June. In 1890, I again

visited Yemassee, and spent eight months collecting in that locality, and although I frequently saw many Bitterns from March until October, I was unable to obtain a nest with eggs.

Hydranassa tricolor ruficollis. LOUISIANA HERON.— This heron still breeds abundantly, and both *young* and adults *winter* numerously in sheltered ponds on the coast islands.

Florida cærulea. LITTLE BLUE HERON.— Breeds in enormous numbers in the fresh-water 'reserves,' and both phases *winter* abundantly on the coast islands.

Butorides virescens. GREEN HERON.— Resident. This species *winters* in small numbers on the coast islands.

Nycticorax nycticorax nævius. BLACK-CROWNED NIGHT HERON.— Breeds sparingly, and *winters* numerously on the coast islands. While at Capers's Island, S. C., on Feb. 6, 1905, I saw in a large pond of brackish water, all congregated together, and seemingly in perfect harmony, the following species:—*Ardea herodias*, *Hydranassa tricolor ruficollis*, *Florida cærulea*, and *Butorides virescens*.

Nyctanassa violacea. YELLOW-CROWNED NIGHT HERON.— On April 20, 1896, I secured a nest and three eggs. The nest was built in a short-leaf pine, 40 feet from the ground, on the high land and half a mile from water.

This fine species breeds in the cypress swamps; generally in isolated pairs, and is as much a diurnal species as *Ardea herodias*. On April 15, 1905, I counted sixteen individuals in a radius of ten rods. The food of *violacea*, in the breeding season, is chiefly cray-fish. After the breeding season, these birds resort to the salt marshes, and feed chiefly upon 'fiddlers' and fish.

Himantopus mexicanus. BLACK-NECKED STILT.— About the middle of May, 1881, I observed at least two pairs of these birds in a freshwater pond, with a growth of reeds, tussocks of grass, and small myrtle bushes, on the extreme eastern end of Sullivan's Island, S. C. These birds were very noisy, and their antics so peculiar that I watched them closely for a long while. In those days my knowledge of ornithology was very limited as regards the distribution of species, and I was not aware of the importance of my discovery. The day upon which these stilts were observed, I was in quest of eggs of *Sterna antillarum*, *Rynchops*

nigra, *Ochthodromus wilsonius*, *Hæmatopus palliatus*, and *Symphemia semipalmata*, which, in those days, bred numerously on Sullivan's Island. There is no question whatever that these birds were breeding, but I did not wade into the pond on account of moccasin snakes, which were abundant. About two weeks later, a relative, who had been spending several months at Cape Canaveral, Florida, brought to me, upon his return to Charleston, several complete sets of eggs of *Himantopus mexicanus* that he had personally collected at the Cape. His description of the breeding habits of the birds left no doubt in my mind that the birds I saw were breeding. This pond was destroyed by a very severe storm before 1884, and since that discovery was made, I have failed to note again the presence of this species in South Carolina.

Philohela minor. AMERICAN WOODCOCK.—In Audubon's 'Birds of America,' Vol. VI, p. 18, he refers to this species as breeding from February to June. This is substantiated by a fine set of four eggs which were found on Capers's Island on February 13, 1903. The nest was on the ground, on a slightly rising plain, and near a wet cover. The eggs were perfectly fresh. On March 4, 1903, another Woodcock's nest was found with four freshly laid eggs, and, in company with my friend, Mr. Benj. T. Gault, of Illinois, we saw the bird incubating. These eggs, or at least two of them, are the handsomest and deepest colored that I have yet seen. Mr. J. H. Riley, in 'The Auk' for July, 1904, p. 384, asks if Woodcock eggs "fade out during incubation or without it." In reply to this question, I will say that the two sets above mentioned are the only ones I have ever seen or taken during the past twenty-five years, and as both sets were fresh and not incubated the color did not change perceptibly in the set taken February 13; while the set taken March 4 did *not* fade at all, at least in the two richly colored eggs. The Woodcock 'sings' and 'peeps' from December until the middle of March in South Carolina.

Ereunetes occidentalis. WESTERN SANDPIPER.—This species is only absent during a part of May and June on the coast. It arrives about the 8th of July in worn breeding plumage, and winters in countless thousands. It is a curious fact that of nearly all the species of Limicolæ that occur on the South Carolina coast,

and which breed in the Arctic Lands, should arrive during the first half of July — namely: — *Macrorhamphus griseus et scolopaceus*, *Tringa canutus*, *Actodromas minutilla*, *Ereunetes pusillus*, *Calidris arenaria*, *Totanus melanoleucus et flavipes*, *Numenius hudsonicus*, *Squatarola squatarola*, *Ægialitis semipalmata*, *Arenaria interpres? et morinella*. *Actodromas maculata* arrives the early part of September, while *Actodromas fuscicollis* and *Pelidna alpina sakhalina* do not arrive until October.

Limosa fedoa. MARBLED GODWIT.— An excessively rare migrant. During the past twenty-five years I have taken but two specimens, as follows:— No. 443, November 3, 1884, ♀, Mount Pleasant; No. 1023, October 9, 1885, ♂, Sullivan's Island.

Bartramia longicauda. BARTRAMIAN SANDPIPER.— The 'Field Plover' is now one of the rarest of the waders that used to be abundant on this coast during both migrations. The earliest spring record upon which I have taken this fine bird is March 28, but they were generally to be seen between April 10 and 16. A pair of these birds undoubtedly bred within a half mile of my house in the year 1901, but all attempts to find the nest proved futile. On May 11, 1901, one of these birds actually followed me, as the Willet (*Symphemia semipalmata*) does in the breeding season. The nest was, or had been, in a cotton field, but must have been destroyed the previous day as the field was ploughed. When this sandpiper grew tired of hovering over me (with almost motionless wings), it would alight on the top of a dead oak tree. I have occasionally seen this bird light on the top of a dead tree in the month of March. These birds must have eventually raised a brood on this plantation, as they were seen until June 20.

Numenius longirostris. LONG-BILLED CURLEW.— The 'Spanish Curlew' is now about extinct on the South Carolina coast, where it once swarmed in countless multitudes. Since 1885, it has been supplanted by the Hudsonian Curlew (*Numenius hudsonicus*), which is still exceedingly abundant during the spring and autumnal migrations. From 1879 to 1885, *longirostris* was to be found in the immediate vicinity of Charleston, but its numbers steadily diminished year after year until at the present time it is so rare a bird that one is seldom seen; in fact I have not seen one since September 23, 1899. I do not think that *longirostris*

has been extirpated by being shot, but that it has changed its route of migration. Audubon, in his 'Birds of America,' Vol. VI, pp. 35 and 36, states, upon the authority of Dr. Bachman, that this Curlew "breeds on the islands on the coast of South Carolina," and it "places its nests so close together, that it is almost impossible for a man to walk between them, without injuring the eggs." Later writers have also asserted that this Curlew breeds abundantly on the South Atlantic coast, namely — Dr. Elliott Coues, 'Birds of the Northwest,' p. 508; 'Key to N. A. Birds,' p. 645; Prof. Daniel Giraud Elliot, 'N. A. Shore Birds,' p. 153; 'A. O. U. Check-List,' 1895, p. 97, and Wickersham, 'The Auk,' Vol. XIX, Oct., 1902, p. 353. I am of the opinion that the authors above mentioned accepted Audubon's account of Dr. Bachman's statement as a fact, and did not substantiate it by their personal experience. It may appear hypercritical to question Dr. Bachman's statement that this Curlew bred on the coast islands, but the eggs were not described by either Audubon or himself, and as far back as 1879 there were no eggs of *N. longirostris* in the Charleston Museum; while the egg of the 'Stone Curlew' (*Symphemia semipalmata*), were well represented and were classified as eggs of the Long-billed Curlew! I have been unable to obtain any evidence, even from the "oldest inhabitants," that *N. longirostris* ever bred anywhere on the South Carolina coast. The birds simply appeared in the autumn and winter, and migrated to their breeding grounds in the Northwest late in the spring. Dr. Bachman made many errors respecting the Limicolæ and I may mention a few. He stated in Audubon's 'Birds of America,' Vol. V, p. 256, that *Tringa canutus* does not occur in South Carolina, in "full plumage"; and again in Vol. VI, p. 12, he states that *Macrorhamphus griseus* does not occur in the "spring in the vicinity of Charleston." It is hardly worth mentioning that both *Tringa canutus* and *Macrorhamphus griseus* occur abundantly on the South Carolina coast during the northward migration. Both of these species attain the highest possible plumage before they start on their long journey to the Arctic Regions. In 1885, Mr. Brewster and the writer collected a very fine series of *Tringa canutus*, in the month of May on Sullivan's Island, S. C. *Macrorhamphus griseus* is in full nuptial plumage by April 28, and it is

characteristic of the males during the month of April and May to soar high in the air with wings 'set' and sing their love song. It will be seen from the above that the Long-billed Curlew will have to be excluded from the list of birds which breed in the South Atlantic States.

Numenius borealis. ESQUIMAUX CURLEW.—I have never seen this Curlew alive, but in the Museum of the College of Charleston there were many mounted specimens, that were labeled by Dr. Bachman as follows: "South Carolina, *Winter.*" All of these specimens were dust-stained and moth-eaten, and when Dr. G. E. Manigault became the curator they, among other birds, were thrown away as trash.

Ectopistes migratorius. PASSENGER PIGEON.—The only Wild Pigeon I ever saw that was killed near Charleston, was shot by a colored man on November 21, 1885, at Sineath's Station, thirteen miles north of Charleston, while he was on a 'deer stand.' I was on the station waiting for the train to go to Charleston, when two hunters came up. One of them took from his bag a young female Wild Pigeon and showed it to me with much pride. As the bird was shot with buck-shot it could not be preserved. While spending a portion of the summer of 1882 at Caesar's Head, Greenville County, South Carolina, I saw two pairs of these birds near the summit of the mountain.

Ictinia mississippiensis. MISSISSIPPI KITE.—This fine bird breeds regularly in considerable numbers near Charleston, but in the region about Yemassee it is an abundant breeding bird. A pair of these kites have bred for ten consecutive years within a mile of my house, and in the *same* nest for five years. On May 28, 1898, I succeeded in finding a man who had the courage to climb the gigantic pine in which the kite had a nest. The nest was 111 feet and 7 inches from the ground and contained one egg. This egg was sent to Dr. William L. Ralph, and is now in the Smithsonian Institution. On May 29, 1902, a single egg, which contained a good sized embryo, was taken from the same nest. The seasons of 1903 and 1904, the birds were found breeding within a hundred yards of their former nest, but the tree was so immense that I could not secure a climber. On May 27, 1905, I found that the kites had occupied the nest they had built and

used in the years 1903 and 1904, and I engaged a man who ascended the tree and lowered the single egg which it contained. This nest was 135 feet from the ground, and the egg contained a large embryo. The eggs are dull bluish-white, generally nest-stained, and measure 1.60×1.31 in. In the region about Yemassee, this kite certainly lays from two to three eggs. Mr. Chapman, in his 'Birds of Eastern North America,' states that this kite "is not common east of Louisiana." While I was on the Suwannee River, Florida, in 1892, I saw daily, between the river and a large plantation, from May 12 until May 28, *hundreds* of these birds, as well as *hundreds* of *Elanoides forficatus*. These kites arrived daily, and with the greatest regularity at 11.50 A. M., and departed at 2.08 P. M. This field was alive with grasshoppers, upon which the kites were feeding, and it was a sight that will never be forgotten.

Aquila chrysaetos. GOLDEN EAGLE.—There are two mounted specimens of this eagle in the Museum of the College of Charleston. One was taken by Thomas Porcher Ravenel, Esq. (a brother of Henry W. Ravenel, the botanist), at or near Pinopolis, South Carolina, and the other specimen was taken by Mr. S. J. L. Matthews, in St. Andrew's Parish, which is just across the Ashley River, and near the city of Charleston. Both birds were taken in the winter. The bird, which was shot by Mr. Matthews, had killed a Wild Turkey (*Meleagris gallopavo*), and it was shot while eating the Turkey. Mr. Matthews's bird is mounted in a group to illustrate how it was secured.

Dryobates borealis. RED-COCKADED WOODPECKER.—Numerous authors, including Audubon, have stated that this species breeds in *dead* pine trees. The latter, in his 'Birds of America,' Vol. IV, p. 255, says that the 'nest is not unfrequently bored in a decayed stump about thirty feet high.' I have seen perhaps a thousand holes in which this woodpecker had bred or was breeding, and *every one* was excavated in a *living* pine tree, ranging from eighteen to one hundred feet above the ground. This bird never lays its eggs until the pine gum pours freely from beneath and around the hole, and in order to accelerate the flow the birds puncture the bark to the 'skin' of the tree thereby causing the gum to exude freely. This species, unlike the Pileated Wood-

pecker, returns to the same hole year after year until it can no longer make the gum exude. But like the Pileated Woodpecker, it is much attached to the tree in which it has first made its nest, and as long as it can find a suitable spot it will continue to excavate new holes until the tree is *killed* by this process of boring. I have frequently counted as many as four holes in one tree, and in two instances I have seen as many as eight. These birds seem to know by instinct that the centre of the tree is rotten, or what lumber men call 'black-heart,' and they never make a mistake when selecting a tree! The hole is bored through the solid wood, generally a little upward, and to the center of the tree (which is always rotten), then downwards to the depth of 9 inches to a foot or more. This species lays from two to five eggs; generally three, rarely four, while five are exceptional. I have taken five eggs but once — on May 14, 1902. The earliest set taken was on April 27, 1884. Only one brood is raised, and these follow their parents during the months of July, August, and September. This Woodpecker is one of the most interesting birds we have. Its notes are harsh and discordant, and it is at all times very restless.

Ceophlœus pileatus. PILEATED WOODPECKER.—This fine woodpecker breeds regularly within a mile of my house every year. During the month of March, 1904, I made observations on a certain pair which had settled upon a dead pine as the place to excavate their hole. On March 21, the opening was commenced by the female, who drilled a small hole, and by degrees enlarged it until the hole was the size of a silver dollar. Both sexes assisted in the excavation, but the female, by far, doing most of the work. The size of the aperture was *not* increased until the shoulders of the bird was reached, when it was made a trifle larger. Every day I visited these birds in order to note the progress of their work, and being so accustomed to seeing me they were utterly fearless, as I could, at any time, approach the one excavating to within twenty feet, without hindering it in its work, although the hole was only about 30 feet from the ground. The hole was completed on April 21, and the first egg was laid the following morning. As incubation commences upon the advent of the first egg, and as the eggs are *not* laid consecutively, I did not again examine the contents of the nest until April 26,

when three eggs were found. Upon investigating the cavity on April 28, and finding but three eggs, I concluded that the set was complete and abstracted it. The excavation was made under a dead limb, and was about 18 inches deep, being hollowed out more on one side than on the other. This woodpecker is so attached to the tree in which it has first made its nest that it will continue to cling to it as long as it can find a suitable spot to excavate a new hole. It never uses the *same* hole after it has been once occupied. I know of a pair of these birds which resorted to the *same* tree for four consecutive years, and each year they excavated a *new* hole.

Another pair of these woodpeckers bred in a gigantic dead pine for three years, and as an illustration that these large holes are in great demand by other birds, and also mammals, for breeding purposes, I will state that on April 16, 1903, there were three species breeding in the *same* tree, namely — *Ceophlax pileatus*, four eggs, 54 feet from ground; *Sciurus niger*, 70 feet from ground; and *Falco sparverius*,— approximately 90 feet from ground — all living together in perfect harmony! If this bird is deprived of its first set of eggs, it at once excavates a new hole, and the length of time consumed in its construction is about twenty-five days. A curious habit of this bird is that it frequently taps in its hole (as if excavating) even when it is incubating or brooding its young.

Chordeiles virginianus. NIGHTHAWK.— The greatest migration that I ever witnessed was of this species. On September 6, 1905, between 5.30 P. M. and sunset, these birds were migrating in dense flocks, which, at times, obscured the sky. As far as I have been able to ascertain these flocks extended over an area of more than fifteen miles from east to west. The number of birds seen must have represented *millions*. Mr. Ferdinand Gregorie, who plants on Daniel's Island, tells me that in every direction the air was filled with these valuable insectivorous birds.

The migration of Fox Sparrows (*Passerella iliaca*), that I witnessed on the morning of February 13, 1899, is insignificant in comparison to the above. (See 'The Auk,' April, 1899, p. 197.)

Spinus pinus. PINE SISKIN.— The winter of 1896 and 1897 will long be remembered on account of the great abundance of

these erratic birds. The first were observed on December 12, 1896, and many remained until the middle of March, 1897. Between these dates, many of the birds taken seemed to be in a state of perpetual moult. These birds were feeding upon the seeds of the sweet gum (*Liquidamber styraciflua*), and short-leaf pine (*Pinus mitis*).

Passerculus princeps. IPSWICH SPARROW.—Dr. Dwight states in his admirable monograph of this sparrow, p. 22, that "the yellow over the eye, acquired late in the spring moult, is equally intense in both sexes, although the individual intensity is variable," and in the "adult in autumn the superciliary line is ashy white or only faintly tinged with yellow." I have a specimen of this Sparrow, No. 4413, ♀ *ad.*, February 3, 1903, Cape Romain, S. C. (D. L. Taylor, collector), which has the superciliary stripe *very strongly* marked with canary yellow. The two central rectrices were being renewed, but they had not acquired their maximum length.

Ammodramus nelsoni subvirgatus. ACADIAN SPARROW.—The Acadian Sparrow is only absent on the coast from June 5 until October 10. These birds arrive in full autumnal plumage, but towards the last of October they begin to moult the feathers about the head and throat. This moult also occurs at or about the same time in all the *Ammodrami* that inhabit the salt marshes, viz:—*Ammodramus caudacutus*, *A. nelsoni*, *A. maritimus*, *A. m. fisheri*, *A. m. macgillivraii*. There is a complete moult in the spring of the above except *A. m. fisheri* and *A. m. macgillivraii*. The primaries, secondaries, and rectrices are also renewed. Audubon was well acquainted with this subspecies. In Vol. III, p. 109, of his 'Birds of America' he says: "Some shot on the 11th of December, in the neighborhood of Charleston in South Carolina, were so pale as almost to tempt one to pronounce them of a different species." A "subspecies," however, was unknown, in those days! Dr. Dwight's description of the song in Mr. Chapman's 'Birds of Eastern North America' is as perfect an imitation as one could write.

Ammodramus maritimus macgillivraii. MACGILLIVRAY'S SEASIDE SPARROW.—The type locality of this form is considered by all ornithologists to be Charleston (or vicinity), South Carolina.

Audubon, however, in his 'Orn. Biog.,' IV, 1838, p. 394, gives its range as including Louisiana and Texas; and in his 'Birds of America,' Vol. III, p. 107, he states that: "My friend Dr. Bachman informs me that none of these Finches remain in South Carolina during winter, and that they generally disappear early in November, when the weather is still very pleasant in the maritime portions of that State." My experience with this bird is exactly contrary to that of Dr. Bachman's, as it is most abundant (if such a word can be used) during the autumnal and *winter* months. Dr. Bachman may have referred to the *young*, which, however, have attained the plumage of the adult before the middle of November. *None* of these sparrows *breed* anywhere on the South Carolina coast; neither do *any* of the Seaside Sparrows; *macgillivraii*, however, must breed near at hand, as the young in first plumage occur during the second week in July, and the adult in worn breeding plumage are to be seen during the third week in July. There is a distinct northward migration which takes place about April 16, and continues until April 27, when they have all gone *north*, and of course to their breeding grounds wherever they may be.

A. m. fisheri also occurs on the South Carolina coast in company with *macgillivraii*, and I have taken numerous "typical" specimens (if the word 'typical' can be considered) in the autumnal months as well as during the *northward* migration. A 'typical' *fisheri* was taken on Oct. 27, 1893, and another *fisheri* was secured on April 16, 1901,—showing the southward as well as the northward migration.

My belief is that *A. m. peninsulae* et *A. m. fisheri* are synonyms of *macgillivraii* Audubon; and that the forms known as *peninsulae* et *fisheri* are merely variants of *macgillivraii*, as *peninsulae* is not known to *breed* on the west coast of Florida, and *fisheri* occurs in South Carolina, in the autumnal and spring months and *must breed* to the northward of South Carolina, perhaps in North Carolina.

Mr. Brewster, in 'The Auk,' April, 1890, p. 212, says that the form he "found breeding in the salt marshes at St. Mary's, Georgia, in 1877, was unmistakably *maritimus*." Macgillivray's Sparrow is said to breed on Anastasia Island and at Matanzas Inlet, Florida. (Ridgway, 'Birds of N. and M. A.' p. 216.) It therefore *breeds*

to the *southward* of the breeding range of *maritimus*, and also with it on the North Carolina coast which is indeed an anomaly! *Macgillivraii* will have to supplant *peninsulae et fisheri*.

Vireosylva olivacea. RED-EYED VIREO.—The controlling influence upon the migration of this bird in the autumn is the presence or absence of the seeds (fruit) of the magnolia (*Magnolia grandiflora*). The fruit of this beautiful tree begins to ripen during the first week of September, but the greater part ripens through October, and many seeds remain in the cones until November. The color is coral-red, and some specimens are about three-fourths of an inch in length, but the great majority average about half an inch. These seeds contain a large amount of oil, and when this vireo has been feeding upon them for any length of time it becomes very obese. There are many beautiful trees on this plantation, and I have often sat on the steps of the old Colonial house and watched these birds while feeding upon the fruit. The tree that has the most fruit attracts nearly all the vireos in a radius of perhaps a quarter of a mile, and I have often counted as many as fifty vireos in one tree. As long as the fruit is to be had, the vireos remain, but as soon as the supply becomes scarce or exhausted, the vireos depart.

The Kingbird (*Tyrannus tyrannus*), and Redstart (*Setophaga ruticilla*), also feed upon the fruit of the magnolia.

Telmatodytes palustris marianæ. MARIAN'S MARSH WREN, and **Telmatodytes palustris griseus.** WORTHINGTON'S MARSH WREN.—Mr. Outram Bangs, in 'The Auk,' October, 1902, p. 353, says that the range of *marianæ* is "Salt marshes of western Florida, non-migratory." I think that Mr. Bangs has overlooked my record, which was the first for the Atlantic coast (see 'The Auk,' October, 1899, p. 361). On October 1, 1898, I obtained a pair (♂ and ♀) which represent the extreme type of coloration, by having the breast heavily barred and spotted. I fail to understand why this bird has been reduced to a subspecies.

Worthington's Marsh Wren is *non-migratory*, as I have already pointed out in 'The Auk,' October, 1899, p. 362. It is still an excessively rare bird and has never recovered from the losses it sustained by the great cyclone of August 27-28, 1893. When in *full adult* plumage this wren is unmistakable — being a *gray*

bird. There is no evidence that *griseus* interbreeds with *marianæ*, and I think it should be give full specific rank. The breeding range of *griseus* extends along the South Carolina coast as far north as the mouth of the Santee River. A glance at the map of South Carolina, will show that there are no salt marshes of any extent from Georgetown to Southport, N. C., in which this wren could breed.

THE FEATHER TRACTS OF SWIFTS AND HUMMINGBIRDS.

BY HUBERT LYMAN CLARK.

Plates II and III.

SOME years ago I undertook to obtain material for a study of the arrangement of the feather tracts in the Swifts and Hummingbirds. Through the kindness of the authorities of the United States National Museum, the alcoholic material in that collection was placed at my disposal, and was carefully examined. Later on, some beautiful hummingbird material from Arizona came into my possession through the efforts of Mr. R. D. Lusk, and in 1897, Mr. C. B. Taylor of Kingston, Jamaica, presented me with some very valuable specimens of both swifts and hummingbirds. In April, 1901, a brief statement appeared in 'The Auk' concerning the conclusions to which the study of this material had led me, and a more extended reference to them appeared in 'Science' for January 17, 1902. The preparation of the entire report, however, was continually postponed in the hope of obtaining more specimens, and in July, 1905, through the kindness of Dr. Witmer Stone, some alcoholic hummingbirds from Brazil were loaned me by the Academy of Natural Sciences of Philadelphia. As there is little

probability at present of securing in this country further material of importance, I have decided to delay no longer the publication of this account of the work that has been done and the conclusions reached.

It is an interesting fact that the pterylography of no group of birds has received so much attention as has that of the swifts and hummingbirds. The classic work of Nitzsch ('40) deals quite fully with the matter, so far as his material and methods allowed. Shufeldt ('88) has given a very full account of the pteryloses of both swifts and hummingbirds, making use however of Nitzsch's figures, which are, unfortunately, very inaccurate. Lucas ('92) has described the pterylosis of the hummingbirds in Ridgway's paper on that group, giving figures of the dorsal and ventral aspects of *Florisuga mellivora*. Thompson (:01) has described in full, and figured well, the pterylosis of *Patagona gigas*, compared it with both *Caprimulgus* and *Collocalia*, and given a figure of the dorsal aspect of the latter. His conclusions were criticised by me in 'Science' (January 17, 1902) and Shufeldt published a counter criticism in 'The Condor' (March-April, 1902), to which a brief reply was made in the next issue of the same journal (May-June, 1902). Discussion centers around the question whether the swifts and hummingbirds have essentially distinct and unique pteryloses or not, and to this question we shall return when we have completed an examination of the evidence in the case. The pterylography of the swifts will be considered first, a brief general description of the cypseline pterylosis being followed by a short account of each genus examined. The account of the hummingbirds follows in the same way, after which the two groups are compared, and final conclusions stated.

In this connection I wish to thank Mr. Lusk, Mr. Taylor, Mr. Stone, and especially Mr. F. A. Lucas, for the help they have given me in securing the needed material, without which nothing could have been done, and to Mr. Stone and Dr. J. A. Allen, I am indebted for assistance in nomenclature.

CYPSELL.

The general pterylosis of the swifts is very distinctive and remarkably uniform, so that the figures of *Chætura pelagica* (Plate II) will answer with slight changes for any of the other species. The tracts are all clearly defined and well feathered, while the apteria are uniformly naked. The forehead is quite thickly feathered, but with large crescent-shaped apteria over the eyes, while the crown and occiput are rather sparsely feathered, in longitudinal rows. The throat is fully feathered but there are apteria along the rami of the lower jaw. The upper cervical tract is very broad, and unites along the sides of the neck with the lower cervical tract, so that there are no lateral cervical apteria. Between the shoulders, it bifurcates to form the dorsal tract. On the anterior part of the neck, close to the head, is a large and very evident apterium, one of the most characteristic features of the pterylosis. It is a very curious fact that Shufeldt ('88 and '02) positively denies the existence of this apterium in the swifts, while Lucas ('92) states that "some of the swifts" possess it, and Thompson (:01) makes no reference to it in his description of *Collocalia*, though his figure shows an entire absence of feathers on the anterior dorsal part of the neck. A careful reëxamination of my material, figures and notes, leaves no doubt whatever of the existence of this apterium in every species of swift examined. I can only account for Shufeldt's statements by supposing that they are based on his examination of *Chætura pelagica* and *Aëronautes melanoleucus*: in *Chætura* this apterium is not very large, while in *Aëronautes* it is smaller than in any other swift. It is not inexplicable therefore that it was overlooked in these cases, but it is hard to see how it could have been overlooked in *Cypseloides*, which he also examined.—The dorsal tract is divided from the shoulders to the middle of the sacrum, by another long but narrow apterium, into two narrow bands of nearly uniform width, but it ends in a single narrow band at the base of the oil gland. The anterior portion of the space between the dorsal and humeral tracts is sometimes separated from the rest so as to form a small but quite distinct apterium on each side of the upper cervical tract. This is well shown in *Cha-*

tura. The femoral tracts though diffuse, are very evident, and are usually long, so that they extend backward almost or quite to the tail-coverts, while anteriorly they reach downward and forward, often to the sternals and along the sides to the posterior end of the humerals. The latter tracts are narrow or of moderate width, passing over the humerus either at its head or near the middle, and are clearly connected with the feathering on the ptergia of the wings and even with the upper cervical tract. The large oil gland is almost surrounded by a small tract, chiefly made up of the upper tail-coverts.

The lower cervical tract is forked quite far forward on the neck, and each half passes into a broad sternal tract which continues without interruption, though becoming narrower, to the belly, where it ends rather abruptly. In many swifts just at the point where these pteryke leave the neck and pass on to the breast, an anteriorly divergent fork of the ventral apterium nearly severs them; this is most evident in *Chatura* and *Hemiproce*. In some of the large swifts (*Hemiproce*, *Cypseloides*) scattered feathers in the region of the furculum tend to unite the anterior ends of the 2 sternal tracts. There is nothing else peculiar or specially noteworthy in the ventral pterylosis, but the sternals are connected anteriorly over the shoulders with the humeral tracts and posteriorly, occasionally, with the femorals.

The characteristic and important features of this pterylosis may be summarized as follows: the presence of supraocular apteria, an upper cervical apterium, and a long and conspicuous spinal apterium, the absence of lateral cervical apteria, the large and diffuse femoral tracts, and the continuity and marked development of the lower cervical, sternal and ventral tracts. In addition to these features, the following points are noteworthy. Aftershafts are present on the contour feathers and are often very large. True down feathers are wanting and filoplumes are not notably abundant, though usually evident on the neck and the posterior part of the back. The oil gland never bears a terminal tuft of feathers. There are always 10 rectrices and 10 primaries. The alula consists of 2 or 3 feathers and in some cases there is also a distinct claw. The secondaries are usually 8 or 9 in number, and the wing quincubital, but in *Cypseloides*, *Hemiproce* and *Macrop-*

teryx there are 10 or 11 secondaries and the wing is aquincubital. Except in *Macropteryx* and *Collocalia*, the skin on the hand is very dark, and this darkening extends in some cases not only along the forearm but nearly to the shoulder.

The above account of the cypseline pterylosis is based upon the examination of 15 swifts, representing 10 species and 8 genera. Nitzsch ('40) studied *Hemiprocne collaris* Temm., *H. acuta* (Cyps. *acutus* Pr. Max v. Neu Wied.) and *Cypselus apus*; Shufeldt ('88), *Chætura pelagica*, *Aëronautes melanoleucus*, and *Cypseloides niger*; and Thompson (:01), *Collocalia epodiopyga*; but so far as I know, the pterylosis has not been examined in any others of the Cypseli. The genera will now be considered in detail.

Macropteryx.

It is especially noteworthy that the pterylosis of this interesting genus does not differ in any essential point from that of *Chætura*. The nuchal apterium is present but is quite small, as the upper cervical tract is comparatively long and narrow. The femoral tracts are notably strong posteriorly. The legs are feathered about to the tarsal joint. The skin on the hand is not dark. The 10 rectrices, 10 primaries, 11 secondaries, and 3 alula feathers are not peculiar, but the wing is aquincubital.

Specimen examined.

No.	Name.	Collection.	Condition.
1	<i>Macropteryx coronata</i> (Tickell).	U. S. Nat. Museum.	Alcoholic; fair.

Collocalia.

The single specimen of this genus which I was able to examine was in poor condition, but the only points in which its pterylosis appeared to differ from that of *Chætura* is in the shape of the upper cervical tract, which is longer and narrower, and the nuchal apte-

rium, which is correspondingly narrow. The tarsus is feathered part way down in front. The skin on the hand is not specially dark. There are 10 rectrices, 10 primaries and 9 secondaries and the wing is quincubital. The alula consists of 2 feathers.

Specimen examined.

No.	Name.	Collection.	Condition.
1	<i>Collocalia</i> sp.?	U. S. Nat. Museum.	Alcoholic; poor.

Thompson (:01) has given a very detailed account of the pterylosis of the head and wing of *Collocalia* and a somewhat briefer description of that of the body. He has also figured the dorsal aspect of the plucked bird. So far as the head and wing are concerned, his figure and descriptions are very good, but it is necessary to take exception to his statements concerning the cervical and femoral tracts. He says that the dorsal tract "runs more than half way up the neck" but does not mention any connection with the pterylæ on the head, and his figure does not show any; either his specimen was peculiar and I must believe, abnormal, or else he has overlooked the real connection which exists. He also states that the "pectoral tracts are . . . separated from the feathering of the neck"; if that is correct, I must consider the specimen still more unique. The statement that there is "no well-defined femoral tract" is not so contradictory to his own figure and to what I have described above, as at first appears, for on page 324, he refers to a "lumbar" tract in *Collocalia*, which indicates that he there uses that term for what is, in this paper, called "femoral"; the word "lumbar" is not used elsewhere in his paper. It is greatly to be regretted that these discrepancies should occur between his paper and my observations. Further study of the pterylosis of this genus is very desirable.

Chætura.

(Plate II, Figs. 1-3.)

The general pterylosis is better shown by the figures given than by any amount of description. The humeral tracts are somewhat narrower than in some genera and less clearly connected with the femoral. The dorsal bands are unusually narrow, especially posteriorly. The legs are feathered to the tarsal joint. The skin on the hand is very dark, but not on the forearm. There are 10 rectrices, the first longest, the fifth shortest. Of the 10 primaries, the first is longest. There are 8 or 9 secondaries, but the first 6 are much longer than the others, and the ninth, when present is very small indeed. The wing is quincubital. The alula consists of 2 feathers.

Specimens examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Chætura pelagica</i> (Linn.).	—	U. S. Nat. Mus.	Alcoholic; fair.
2	" "	—	" "	" "
3	" "	Amherst, Mass.	H. L. C.	" "
4	" "	Olivet, Mich.	" "	" very good.

Hemiprocne.

The general pterylosis is essentially the same as in *Chætura*. The ventral cervical apterium is very well defined, and is separated from the great ventral apterium by numerous feathers in the region of the furculum. The femoral tracts are very broad and extend backward to the upper tail-coverts, but their anterior prolongation on the sides is not specially noticeable. The legs are feathered to the tarsal joint. The skin of the hand is very dark, but that of the forearm is lighter. There are 10 rectrices, of which the outer ones are longest and the middle pair shortest. Of the 10 primaries, the tenth is the longest and the others are successively shorter to the first. There are 10 secondaries and the wing is aquincubital. The alula consists of 3 feathers and a distinct claw.

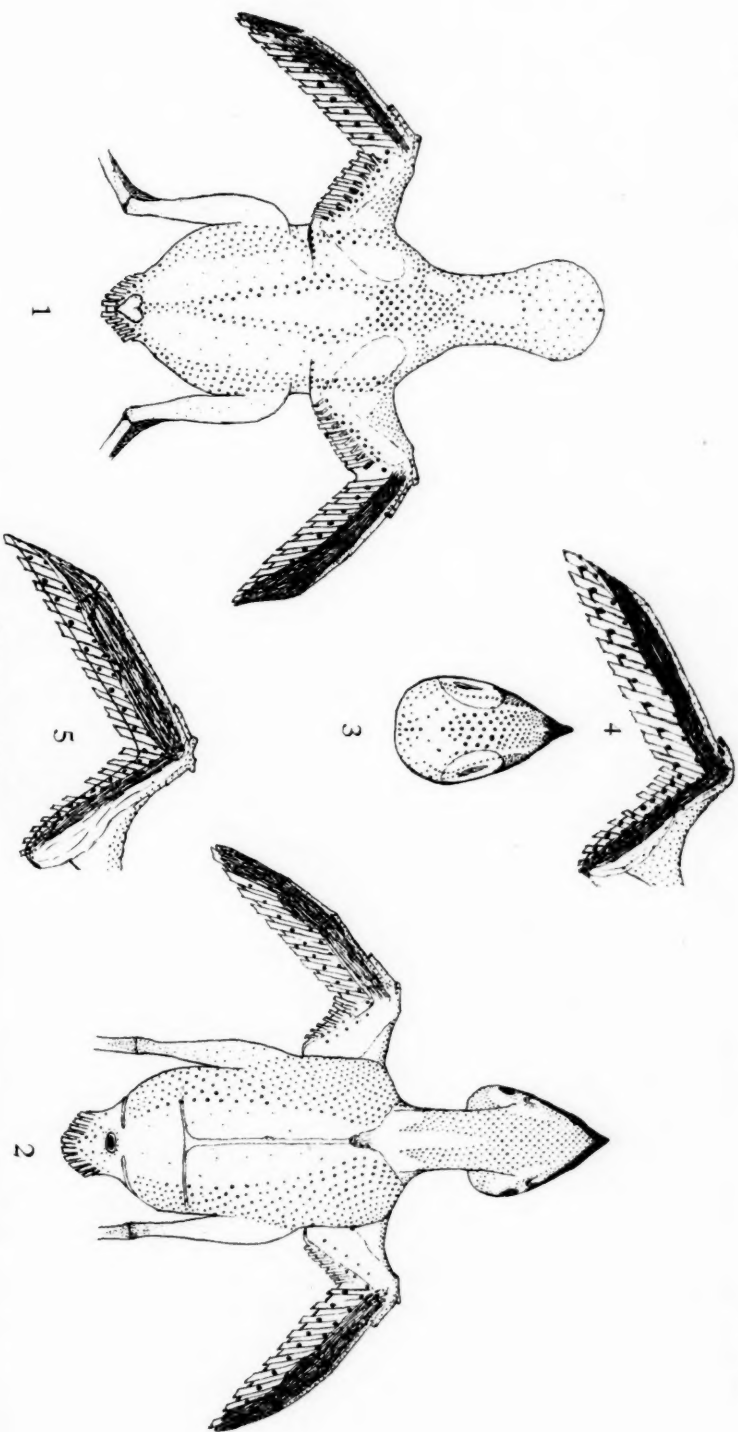


FIG. 1.—Dorsal view of the pterylosis.

2. Ventral view of the pterylosis.

3. Pterylosis of the crown and forehead.

FIG. 4.—Dorsal view of the pterylosis of the wing. 5. Ventral view of the pterylosis of the wing.

All figures natural size.



Specimen examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Hemiprocne zonaris</i> (Linn.)	Jamaica.	U. S. Nat. Mus.	Alcoholic; very good

Nitzsch refers to the "lange, kräftige, dichtfiedrige" femorals, and to the width of the branches of the dorsal tract, "ziemlich breit" in *collaris*, "zweireihig fiedrig" or "einreihig" posteriorly in *acuta*. In both, he says, he found "sechszehn Schwingen," which is probably a mistake.

Cypseloides.

(Plate II, Figs. 4-5.)

The general pterylosis of this genus is not essentially different from that of *Chætura*, but the tracts are wider and more thickly feathered. The legs are feathered to the tarsal joint. The skin on the hand and forearm, and even on the upper arm, is very dark. There are 10 rectrices, 10 primaries, and 10 secondaries, and the wing is aquincubital. The alula consists of 3 feathers and a little claw.

Specimen examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Cypseloides niger</i> (Gmel.).	Jamaica.	U. S. Nat. Mus.	Alcoholic; very good.

Tachornis.

In this genus, the nuchal apterium is small, but otherwise the pterylosis is remarkably like *Chætura*. The legs are sparsely feathered to the very base of the toes in front, but the tarsus is bare behind. The skin on the hand is almost black, and the darkened color extends nearly to the shoulder. There are 8 rectrices and

10 primaries; of the latter, the ninth is the longest, and even the eighth is longer than the tenth. There are 10 secondaries, the wing is quincubital, and the alula consists of 2 feathers.

Specimens examined.

No.	Name.	Collection.	Condition.
1	<i>Tachornis parva</i> (Licht.).	U. S. Nat. Museum.	Alcoholic; fair.
2	" "	" "	" good.

Aëronautes.

This genus is notable for the very small nuchal apterium but in other respects is very similar to *Chætura*. The legs are feathered in front to the base of the toes. The skin on the hand is very dark. There are 10 rectrices, and 10 primaries of which the ninth is longest. The wing is quincubital and has 9 secondaries and 3 feathers in the alula.

Specimens examined.

No.	Name.	Collection.	Condition.
1	<i>Aëronautes melanoleucus</i> (Baird)	U. S. Nat. Museum.	Alcoholic; good
2	" "	" "	" "

Micropus.

The humeral tracts in this genus are somewhat peculiar, for in *melba* they seem to have a small horizontal branch on the inner side extending in towards the dorsal, while in *æquatorialis* and *streubeli*, they pass very nearly over the head of the humerus and thus are nearer the dorsal tract than in *Chætura*. In *melba*, the nuchal apterium is short and wide, but in the others is long and narrow. The legs are feathered to the toes in front, in *æquatorialis* and *streubeli*, but only about half way down the tarsus in *melba*. The skin on the hand is very dark but not on the forearm. Of

the 10 rectrices the middle pair is shortest, the outer ones longest; in *streubeli*, however, there is a sexual difference, for the tail is only a very little forked in the female, while in the male the fork is deep and the feathers narrowed. Of the 10 primaries, either the ninth or tenth may be longest. The quincubital wing has 8 or 9 secondaries and the alula is made up of 2 or 3 feathers.

Specimens examined.

No.	Name.	Collection.	Condition.
1	<i>Micropus melba</i> (Linn.).	U. S. Nat. Museum.	Alcoholic; good.
2	“ <i>aequatorialis</i> (Müll.).	“	“
3	“ <i>caffer streubeli</i> (Hartl.) ♂	“	“
4	“ “ “ ♀	“	“

Cypselus.

Nitzsch describes and figures the pterylosis of *Cypselus apus*, but the arrangement of the feathers and tracts on the head and neck are certainly not as he shows it, unless we are to believe that this genus differs radically from all other known swifts. He says there are “achtzehn Schwingen,” which is probably correct.

TROCHIL.

The hummingbirds are another group in which the pterylosis is remarkably uniform and quite distinctive, so that the figures given of *Trochilus alexandri* will answer with slight changes for any other species. The tracts are well defined and the apteria are perfectly bare. The head is not thickly or uniformly clothed but on the contrary the feathers tend to form longitudinal rows or narrow tracts with more or less definite apteria between. Thompson (:01) figures and describes admirably no less than 10 apteria on the head of *Patagona*, and other hummingbirds show the same general arrangement. Of these apteria, the most important are those to which he gives the names *frontal* and *supraocular*, both

being characteristic of the Trochili. The upper cervical tract is completely united on each side of the neck with the lower cervical for a considerable distance, so that there is a distinct lateral cervical tract for some little distance on the side of the neck, which ultimately divides to form the real cervicals. The conspicuous and characteristic nuchal apterium occupies the upper surface of the greater part of the neck. The humeral tracts are well defined, rather short, pass over the upper end of the humerus, and at their posterior end are usually very slightly connected by 2 or 3 feathers with the dorsal tract. The latter is very broad, covering most of the back, but contains a long and conspicuous spinal apterium. Posteriorly it unites more or less completely with the femoral tracts, though the latter are usually quite easily distinguished, as the feathers composing them are larger and stouter than those which connect them with the dorsal. The lower cervical tract is divided as far forward as the angle of the mouth, into two branches, which for a part of their length are united with the upper cervical, as already described. Each half passes backward, over the sides of the breast, as the sternal tract, which is wide and well developed; they terminate so abruptly just posterior to the margin of the sternum that there are practically no ventral tracts. Anteriorly the sternal tracts are connected over the shoulders with the feathering on the upper side of the wings and thus with the humerals.

The characteristic and important features of this pterylosis may be summarized as follows: the presence of frontal and supra-ocular apteria, a very large and conspicuous nuchal apterium, and a long and conspicuous spinal apterium, the absence of lateral cervical apteria, the small femorals noticeably connected with the dorsal, the well-marked sternals and practical absence of ventrals. In addition to these features, the following points are worthy of note. Aftershafts are present on the contour feathers though very weak. True down feathers are wanting and filoplumes are not notably abundant except on the neck and to a lesser extent on the back. The oil gland never bears a terminal tuft of feathers. There are always 10 rectrices and 10 primaries; of the latter, the tenth is the longest, the others successively shorter. The alula is usually wanting, though a single feather is sometimes present

indicating its position. The secondaries are usually 6, but not uncommonly 7, in number, and the wing seems to be generally aquincubital, though in several cases examined it was clearly quincubital. In one instance one wing had 6 secondaries and was clearly aquincubital as in *Patagona*, while the other wing had 7 secondaries and was as certainly quincubital. Apparently this point in wing structure is no longer of significance in the hummingbirds. The skin on the hand is often very dark, and this color extends more or less markedly onto the forearm.

This account of the trochiline pterylosis is based on the careful examination of 31 hummingbirds, representing 17 species and 15 genera, and on Thompson's (:01) very valuable study of *Patagona gigas*, Nitzsch's ('40) figure and description of *Chrysolampis moschitus*, Shufeldt's ('88) account of *Selasphorus platycercus*, and Lucas's ('92) figure and brief description of *Florisuga mellivora*. So far as I know, no other hummingbirds have ever been examined pterylographically. The various genera will now be considered in detail.

Campylopterus.

Reference is made to this genus only because Lucas ('92) states that the skin of the hand is "colored black" as in the swifts and some other hummers.

Florisuga.

The single specimen examined showed no peculiarities, except that there were apparently only 9 primaries, doubtless accidental or an abnormal condition. The skin on the hand is black.

Specimen examined.

No.	Name.	Collection.	Condition.
1	<i>Florisuga mellivora</i> (Linn.)	U. S. Nat. Museum.	Alcoholic; very poor.

The figure and description of this genus given by Lucas ('92) are fairly good, though I find no tendency in the sternal tracts to

connect with each other near the furculum, either in *Florisuga* or any other hummer, as indicated in Lucas's figure. Moreover the head and wing are too closely feathered, and the humeral tracts are not well enough defined. Incidentally, I wish to dissent strongly from Lucas's statements as to the reasons for the existence of the various apteria.

Patagona.

The pterylosis of this genus, so admirably figured and described by Thompson (:01), deserves special mention because of the presence of 7 secondaries in the aquincubital wing, and of a "lateral tract" just outside of the sternal tract. This small tract occurs in no other genus of Trochili, so far as I know, but a similar tract occurs in *Todus*, according to Nitzsch's figure. It would be interesting to know if the tract has any special significance in *Patagona* or is composed of feathers in any way peculiar, or different from those which make up the sternals.

Argyrtria.

There is nothing exceptional or worthy of note in this genus, except that the formula for the length of the rectrices is 3-2-4-1-5.

Specimen examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Argyrtria brevirostris</i> (Less.).	Brazil.	Phil. Acad. Nat. Sci.	Alcoholic; fair.

Eucephala.

The general pterylosis is like that of *Trochilus alexandri*. There are 6 secondaries in the right wing, with 7 major coverts, and the wing is clearly aquincubital, but in the left wing there are 7 well developed secondaries, of nearly equal size, and only 7 major coverts, the wing being perfectly quincubital. The tail is slightly

forked, the middle pair of rectrices being shortest and the outer pair longest. The legs are feathered just over the tarsal joint.

Specimen examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Eucephala cæruleo-larvata</i> (Gould).	Brazil.	Phil. Acad. Nat. Sci.	Alcoholic; poor.

Thalurania.

There is nothing to be said of this genus to distinguish its pterylography from other hummingbirds. The tail is deeply forked, the outer feathers being much the longest.

Specimen examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Thalurania</i> sp.?	Brazil.	Phil. Acad. Nat. Sci.	Alcoholic; good.

Lampornis.

In this genus, the secondaries are 6 or 7, but the wing is clearly aquincubital. The skin on the hand, and even on the forearm, is very dark. In the specimens examined the rectrices were 2-1-3-4-5 in one, and 4-5-3-2-1 in the other.

Specimens examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Lampornis violicauda</i> (Bodd.).	Brazil.	Phil. Acad. Nat. Sci.	Alcoholic; good.
2	"	"	"	" very poor.

Chrysolampis.

In his account of *Trochilus moschitus* Nitzsch ('40) refers to the small aftershaft, the absence of down, the broad, rhombic form of the dorsal tract, the long and rather broad spinal apterium, the slight development of the femoral tracts, the nuchal apterium, and the large oil gland. The figure given (Plate III, fig. 19) was probably prepared from a skin and is seriously defective in its representation of the tracts and spaces on the head, neck, and posterior part of the back.

Leucochloris.

There is nothing specially noteworthy about this genus, except that in both specimens the right wing had 7 secondaries and the left 6, but all four wings were clearly aquincubital. In one specimen the formula for the rectrices is 1-2-3-4-5 and in the other it is 3-2-1-4-5.

Specimens examined.

No.	Name.	Locality.	Collection.	Condition.
1 2	<i>Leucochloris albicollis</i> (Vieill.).	Brazil.	Phil. Acad. Nat. Sci.	Alcoholic; good.

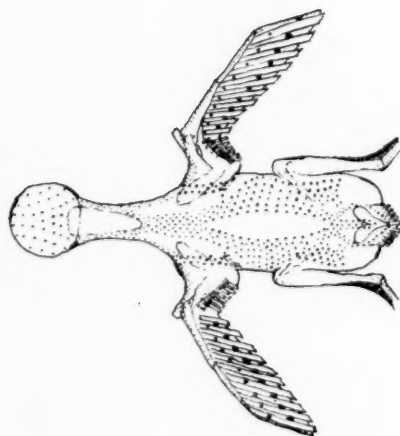
Eugenes.

The pterylosis of this genus is exactly like *Caligena*. There are 6 or 7 secondaries and the formula for the rectrices is 5-4-3-2-1 in the male and 4-3-2-1-5 in the female.

Specimens examined.

No.	Name.	Sex.	Locality.	Collection.	Condition.
1 2	<i>Eugenes fulgens</i> (Swains.).	♂ ♀	Arizona.	H. L. C.	Alcoholic; very good.





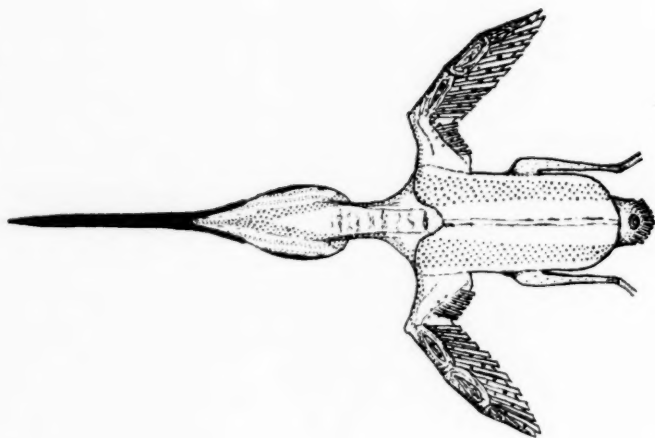
1



3



4



2

FIG. 1. Dorsal view of the pterylosis. Nat. size. 2. Ventral view of the pterylosis. Nat. size. 3. Pterylosis of the crown and forehead. Nat. size. *TROCHILUS ALEXANDRI*.
FIG. 4. Pterylosis of the crown and forehead of a nestling, about 3 days old. $\times 2$. *MELANISUGA MINIMA*.

Cœligena.

In this genus the head is more sparsely feathered than in *Patagona*, with the lines of feathers very clear, the occipital apterium is very distinct, the frontal apterium is very long, and the humeral tract is clearly connected with the dorsal. The secondaries are 6 or 7, the wing is aquincubital, and the formula for the rectrices is 4-3-2-5-1.

Specimens examined.

No.	Name.	Sex.	Locality.	Collection.	Condition.
1 2	<i>Cœligena clementiae</i> (Less.).	♂ ♀	Arizona.	H. L. C.	Alcoholic; very good.

Trochilus.

(Plate III, Figs. 1-3.)

The pterylosis of this genus is clearly shown in the figures given, and is an excellent example of the trochiline condition. The feet are feathered to the tarsal joint. There are 6 secondaries and the wing is aquincubital.

Specimens examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Trochilus alexandri</i> Bourc. & Muls.	—	U. S. Nat. Mus.	Alcoholic; good.
2	" "	—	"	" "
3	" "	Arizona.	H. L. C.	" very good.
4	" "	"	"	"

Calypte.

The pterylosis of this genus shows no peculiarities whatever, nor is there anything noteworthy in the details, concerning the primaries, secondaries, alula and rectrices.

Specimen examined.

No.	Name.	Collection.	Condition.
1	<i>Calypte anna</i> (Less.).	U. S. Nat. Museum.	Alcoholic; fair.

Selasphorus.

In this genus, the femoral tracts are extended further backwards and downwards than in most hummingbirds, so that there is a slight connection between them and the group of under tail coverts. The legs are feathered to the tarsal joint. There are 6 secondaries, and the wing is probably normally aquincubital. Of the 10 rectrices, the first is longest and fifth shortest in the male, while in the female of *platycercus* the formula is 2-3-1-4-5.

Specimens examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Selasphorus rufus</i> (Gmel.).	—	U. S. Nat. Mus.	Alcoholic; good.
2	" "	—	"	" "
3	" "	—	"	" "
4	" <i>platycercus</i> (Swains.).	Arizona.	H. L. C.	" very good.
5	" "	"	"	"

Mellisuga.

(Plate III, Fig. 4.)

Although no adults were examined, there is no indication in the nestlings that the pterylosis differs from that of *Trochilus*. Even in the embryos, the characteristic features of the pterylosis are evident. In the nestlings, the feathering of the head shows some peculiarities, which are illustrated in the figure given.

Specimens examined.

No.	Name.	Age.	Locality.	Collection.	Condition.
1	<i>Mellisuga minima</i> (Linn.).	Embryo.	Jamaica.	H. L. C.	Alcoholic; good.
2	" "	"	"	"	"
3	" "	Nestling.	"	"	" very good.
4	" "	"	"	"	"

Orthorhynchus.

There is nothing specially noteworthy with reference to this genus, for even in details it agrees with *Trochilus*. Of the 10 rectrices, the first is longest, the fifth shortest.

Specimens examined.

No.	Name.	Collection.	Condition.
1	<i>Orthorhynchus exilis</i> (Gmel.).	U. S. Nat. Museum.	Alcoholic; good.
2	" "	"	"
3	" "	"	"

Stephanoxys.

The long plume on the head is located in the group of feathers between the frontal and occipital apteria and its "pit" is very conspicuous in the plucked bird. There is nothing specially peculiar in the general pterylosis, but one wing is apparently quincubital. The tail formula is 2-1-3-4-5. The feet are feathered just over the tarsal joint, and the skin on the hand along the upper anterior edge, and even on the forearm is very dark.

Specimen examined.

No.	Name.	Locality.	Collection.	Condition.
1	<i>Stephanoxys delalandii</i> (Vieill.):	Brazil.	Phil. Acad. Nat. Sci.	Alcoholic; good.

Genus unknown.

An unidentified hummingbird (No. 23493 U. S. Nat. Mus.) shows a pterylosis exactly like the others, and is mentioned here simply to complete the list of those examined.

COMPARISON OF THE TWO GROUPS.

Before entering on a detailed comparison of the two groups which we have been examining, it will set some of the facts more clearly before us if we arrange them in tabular form.

	Cypseli.	Trochili.
No. of primaries	10	10
The three longest	10-9-8	10-9-8
No. of feathers in alula	2-3	0-1
Aftershaft	Present	Present
Condition of oil-gland	Bare	Bare
True down	Wanting	Wanting
Condition of wing	Either aquincubital or quineubital.	Usually aquincubital.
No. of secondaries	8-11	6-7
No. of rectrices	10	10
Frontal apterium	Wanting	Present
Occipital "	Indistinct	"
Supraocular "	Present	"
Nuchal "	"	"
Spinal "	"	"
Lateral-cervical "	Wanting	Wanting
Femoral tracts	Large, separate from dorsal	Small, connected with dorsal
Skin of hand	Usually very dark	Often very dark

It will readily be seen from the table and the foregoing accounts of the two groups that the points of difference between swifts and hummingbirds are comparatively few, and the important matter to determine is whether these differences are trivial or not. These points are the presence of frontal and occipital apteria in Trochili, their virtual lack of an alula, their small number of secondaries, their very broad, diamond-shaped dorsal tract and its practical union with the femorals, and their almost complete lack of ventral tracts. Let us consider these points under the three following heads, (1) pterylosis of head and neck; (2) pterylosis of wings; (3) pterylosis of trunk and legs.

Pterylosis of the Head and Neck.—In all birds, the distribution of the feathers on the head seems to be more liable to variation than on any other part of the body; among the Caprimulgi, for example, we find that the different genera exhibit quite a notable diversity in the pterylosis of the head. When we consider therefore how the whole head of the hummingbird has been altered for its peculiar feeding habits, and how the plumage of the head has been modified in connection with the development of the gorgeous metallic colors, we should expect a characteristic pterylosis. When on the other hand, we consider how nearly in the opposite direction the modification of the swift's head has been, and that there is no development of a peculiar head plumage, it is not strange that there are some differences in the arrangement of the feathers of the head and neck between hummingbirds and swifts. That these differences are due to the modification of the trochiline head in connection with feeding habits is certainly suggested, if not demonstrated, by the pterylosis of the nestling hummingbird. A comparison of figure 4, plate III, with figure 3, plate II, certainly suggests a real resemblance between the two. The long, narrow frontal apterium shown by all adult hummingbirds, is almost wanting in the nestling, as it is in swifts, while the sparse feathering of the occipital region is quite as evident in *Chatura* as in *Mellisuga*. On the other hand, the nestling shows clearly the supraocular and nuchal apteria, and the absence of lateral cervical apteria which are such characteristic features of both swifts and hummers. It is a natural conclusion therefore, that the fundamental plan of the pterylosis of head and neck was originally similar, if not identical, in the Cypseli and Trochili.

Pterylosis of the Wings.—The general arrangement of the remiges and coverts of the wing is quite similar in the two groups under consideration, and such differences as occur are closely associated with the size of the bird. Thus we know that, as a rule, the smaller the bird, the fewer will be the secondaries, lesser coverts and alula feathers, and this is well shown by the swifts and hummingbirds. As regards the quincubital or aquincubital condition of the wing there is no constant difference between the two groups, for, as already shown, individual hummingbirds show variability on this point, and neither condition is characteristic

of the swifts, as a whole. A comparison of figures 4 and 5 of plate II, with the wings of *Chaetura* and *Trochilus*, will emphasize how really intermediate between the two swifts, in this point, the hummingbird is. There is no essential difference in the humeral tracts, though those of the swifts are more obviously connected with the dorsal and femoral tracts, than are those of the Trochili.

Pterylosis of the Body.— In the form of the dorsal tract swifts and hummingbirds differ. In the latter it broadens on the middle of the back, extending downward to the sides, and then narrowing again to a point at the oil gland; were it not for its obvious connection with the femoral tracts on each side, it would thus be an almost perfect diamond in shape. In the swifts, on the contrary, the tract does not extend downward on the sides nor does it directly connect with the femorals; its shape therefore is that of an elongated ellipse. In each case, however, there is the well marked spinal apterium, a very important point of resemblance. In the swifts, the femoral tracts are well developed, extend forward on the sides to the posterior part of the humerals, and backwards to connect with the upper tail-coverts. In the hummingbirds, however, the femorals are weak and only extend towards the dorsal with which they connect. It is evident therefore, that in the swifts the dorsal tract has become quite sharply defined, and the femorals extended to form a part of the covering for the sides, while in the hummingbirds the dorsal tract remains more extensive, has not become separated from the femorals, and provides all the covering for the sides. Thus the dorsal pterylosis of the swifts indicates a greater specialization than that of the hummingbirds, possibly associated with their extraordinary power of flight. The ventral pterylosis of the Cypseli is essentially identical with that of the Trochili, for the apparent absence of ventral tracts in the latter is a difference of degree, not of kind, while the separation of a lower cervical apterium from the ventral, in some swifts, is also an unimportant character, present in only a few species.

CONCLUSIONS.

In bringing to a close this account of the pterylography of swifts and hummingbirds, it is worth while to consider two general ques-

tions, still open to discussion, which may be stated as follows: Is the pterylosis of a swift sufficiently similar to that of a hummingbird to give support to the view that they have a common ancestry? If so, is that of the *Caprimulgi* sufficiently similar to warrant the belief that they also have the same ancestry? There are some other interesting questions which arise in connection with these, particularly as to whether the swifts and swallows have anything in common and as to what birds are most nearly allied to the groups considered in this paper. But lack of sufficient reliable evidence forbids any attempt to touch on such questions. Let us turn to those first stated: 1. *Is the pterylosis of a swift sufficiently similar to that of a hummingbird to give support to the view that they have a common ancestry?*

In the judgment of the writer, YES. What may properly be called the fundamental plan of the pterylosis is essentially the same. That is to say, each group has apparently sprung from an ancestor in which the head was fairly uniformly, though sparsely feathered except for an apterium over the eye; the neck had the upper and lower cervical tracts united anteriorly, so that there was no lateral cervical apterium; there was a conspicuous nuchal apterium; the back was well covered by a broad dorsal tract containing an elongated spinal apterium; but not fully distinct from the femoral tracts or even from the humerals; the lower cervical tract was deeply forked and continuous with the conspicuous sternal tracts; and the latter were separate from each other, and extended on to the belly as short, wide, ventral tracts. As regards the dorsal tract, it seems to me probable that this ancestral form was a bird in which the humeral, dorsal, and femoral tracts were more or less connected, and the two latter at least not sharply defined, somewhat as Nitzsch figures the dorsal surface of *Colius*; this condition was followed by such a pterylosis as Nitzsch shows for *Cuculus*, in which the spinal apterium has appeared; from this arrangement the dorsal tract of the hummingbird would arise with little change, while the cypseline condition would follow further condensation of the dorsal tract, accompanied by development of the femorals. In addition to this agreement in fundamental plan, the swifts and hummingbirds have so many details, of more or less importance, in common, we may say further of their ancestral form that it had 10 primaries with the 3 outermost

longest, and 10 rectrices; probably 9 secondaries, an alula of 3 feathers, an aftershaft on the contour feathers, no down feathers, filoplumes rather few and mainly confined to the neck and back, the feet feathered to the tarsal joint, the oil gland without a terminal tuft of feathers, and the skin on the hand dark colored. Whether the wing was originally aquincubital or not is open to question but judging from the wings of the hummingbirds examined, the evidence would seem to favor the view that the quincubital condition of most of the swifts is a specialized condition, and the ancestral form was probably aquincubital.

In the subsequent development of the Cypseli and Trochili, the pterylosis of the head and neck became more specialized in the latter group, while that of the back has been more modified in the swifts; with the wings, specialization has occurred in both groups, perhaps to a greater extent in Trochili, which have lost the alula, and 2 or 3 secondaries, and are apparently approaching the quincubital condition. Shufeldt ('88) in attempting to show the absence of relationship between swifts and hummingbirds lays much stress on the difference in the number of secondaries, the form of the dorsal tract, the absence of supraocular and nuchal apteria in swifts and the absence of femoral tracts and of black skin on the hand in hummingbirds. As has been repeatedly shown in the previous pages, his position is clearly based on insufficient or unreliable evidence; the number of secondaries is almost wholly a matter of size, the form of the dorsal tract is a real difference but not inexplicable, the supraocular and nuchal apteria are *not* absent in swifts, and the femoral tracts and black skin on the hand are *not* wanting in hummingbirds.

2. *Is the pterylosis of the Caprimulgi sufficiently similar to that of swifts or hummingbirds to give support to the view that they have a common ancestry with either?*

In the judgment of the writer, NO. Although the linear arrangement of the feathers on the head of the *Caprimulgi* (see Clark, '94) seems at first somewhat similar to that in *Patagona* (see Thompson, :01) the more the pteryloses of the two groups are compared, the more evident it seems that there is no indication of a common fundamental plan in the two. The upper cervical tract in the *Caprimulgi* is quite narrow with no trace of a nuchal apterium,

and is more or less separate from the dorsal tract; the lower cervical is also narrow and not divided so far up on the throat as even in the swifts. Lateral cervical apteria are very evident. The dorsal tract of the Caprimulgi is clearly derived from an ancestral form in which the anterior and posterior portions were not equally well developed; moreover the spinal apterium is not long and narrow, but short and wide, with sharp lateral angles. Probably the caprimulgine form is derived from such a condition as is shown in Nitzsch's figure of *Falco brachypterus*, rather than from a form like that of *Cuculus*. The humeral tracts in Cypseli and Trochili are near the dorsal and there are some feathers connecting them therewith, but in Caprimulgi the humerals are narrow and distinct, at some distance from the dorsal. The form and position of the femoral tracts is clearly different in the Caprimulgi from those in the Cypseli and Trochili, and the marked contraction of the sternal tracts to form the ventrals is a minor characteristic of the Caprimulgi. Some of the details in which the Cypseli and Trochili agree are not the same in the Caprimulgi, as for example, the black skin on the hand and the last three primaries being the longest; the development of the alula and the presence of 12 or more secondaries in Caprimulgi may also be mentioned, though no weight should be attached to such differences taken by themselves.

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TWENTY-THIRD CONGRESS OF THE AMERICAN
ORNITHOLOGISTS' UNION.

THE TWENTY-THIRD CONGRESS of the American Ornithologists' Union convened in New York City, Monday evening, November 13, 1905. The business meeting, and public sessions, November 14, 15 and 16, were held at the American Museum of Natural History, and the final session, Thursday afternoon, at the Brooklyn Institute of Arts and Sciences.

BUSINESS SESSION.—The meeting was called to order by Vice-President Batchelder, in the absence of the President, Mr. Charles B. Cory. Sixteen Fellows were present. The Secretary's report gave the membership of the Union at the opening of the present Congress as 860, constituted as follows: Fellows, 45; Honorary Fellows, 18; Corresponding Fellows, 65; Members, 71; Associates, 661.

During the year the Union lost fifty-eight members, five by death, twenty-seven by resignation, and twenty-six for non-payment of dues. The deceased members were: Walter E. Bryant,¹ a Corresponding Fellow, who died in San Francisco, Calif., May 21, 1905, aged 44 years; Dr. Sylvester D. Judd, a Member, who died Oct. 22, 1905, at the age of 34; Charles E. Bailey, of North Billerica, Mass., Dr. Mortimer Jesurun, of Douglas, Wyoming, and John C. Knox, of Auburn, N. Y., Associates.

The report of the Treasurer showed the finances of the Union to be in a satisfactory condition, much better than ever before.

Charles F. Batchelder was elected President; E. W. Nelson and Frank M. Chapman, Vice-Presidents; John H. Sage, Secretary; Jonathan Dwight, Jr., Treasurer; Ruthven Deane, A. K. Fisher, Thos. S. Roberts, Witmer Stone, William Dutcher, Chas. W. Richmond, and F. A. Lucas, members of the Council.

Walter K. Fisher, of Palo Alto, Calif.; Lynds Jones, of Oberlin, Ohio; and Wilfred H. Osgood, of Washington, D. C., were elected Fellows. Dr. Chas. W. Townsend, of Boston, Mass.; John E. Thayer, of Lancaster, Mass.; Rev. Wm. Leon Dawson, of Seattle,

¹ For an obituary notice, see Auk, XXII, pp. 439-441.

Wash.; James H. Riley, of Washington, D. C.; and Austin H. Clark, of Boston, Mass., were elected to the class of Members, and the following seventy-one persons were elected Associates, namely:

John A. Aiken, Greenfield, Mass.; William B. Allison, New Orleans, La.; Mrs. Bennet F. Ball, Oakville, Conn.; Edwin Beaupre, Kingston, Ontario; Henry F. Blount, Washington, D. C.; Allen Bourn, Yonkers, N. Y.; Mrs. Mary G. Bowman, Springfield, Mass.; Courtenay Brandreth, Ossining, N. Y.; M. C. Buffum, Newport, R. I.; Thos. L. Burney, Lynn, Mass.; Mrs. John H. Cady, Providence, R. I.; Mrs. Robert Campbell, Jackson, Mich.; J. M. Carroll, Waco, Texas; James P. Catlin, Ottawa, Ill.; Dr. E. A. Chapman, New York City; Emily L. Clark, St. Johnsbury, Vt.; Susan E. Clark, St. Johnsbury, Vt.; Lucy V. Baxter Coffin, Chicago, Ill.; F. M. David, Damariscotta, Me.; Samuel S. Dickey, Waynesburg, Pa.; E. A. Doolittle, Painesville, Ohio; Henry L. Douglas, Brockton, Mass.; Alexander D. DuBois, Chicago, Ill.; W. L. R. Emmet, Schenectady, N. Y.; A. H. Gallup, Ottawa, Ont.; Earle R. Greene, Atlanta, Ga.; Mrs. C. B. Graves, New London, Conn.; Campbell Hamilton, Brooklyn, N. Y.; Mrs. Henry W. Hardon, New York City; John H. Hardy, Jr., Arlington, Mass.; Miss Helen P. Haskell, Alton, Ill.; Ashton E. Hemphill, Holyoke, Mass.; Harold Herrick, New York City; Alfred C. Hill, Belmont, Mass.; Isabel B. Holbrook, Rockland, Mass.; Bruce Horsfall, Red Bank, N. J.; Chas. F. Jenney, Boston, Mass.; Geo. H. Kent, Suffolk, Miss.; Mrs. Henry A. Knapp, Scranton, Pa.; Dr. Victor Kutchen, Dartford, Wis.; A. Lechasseur, Trois-Pistoles, Quebec; Louis E. Legge, Portland, Me.; Mark W. Maclay, Jr., New York City; Nell K. McElhone, New York City; Miss Emily McNeil, Cromwell, Conn.; Henry F. Merriam, Summit, N. J.; W. B. Mershon, Saginaw, Mich.; Miss Elizabeth Putnam Moore, New York City; Franklin H. Mosher, Wakefield, Mass.; Robert C. Murphy, Mt. Sinai, N. Y.; Mrs. Harry A. Noyes, Hyde Park, Vt.; Geo. P. Perry, Sterling, Ill.; Mrs. Rose A. Pickering, Middletown, Ind.; Mrs. Wallace Radcliffe, Washington, D. C.; John A. Remick, Jr., Boston, Mass.; H. S. Reeside, Washington, D. C.; Harriet Richardson, Washington, D. C.; Harrison Sanford, New York City; Harry C. Sargent, Newton, Mass.; Carleton Schaller, New York City; A. R. Shearer, Mount Belvieu, Texas; Charles Sheldon, New York City; Watson Snyder, Newark, N. J.; Loring T. Swain, Cambridge, Mass.; Roy Thompson, Cando, N. Dak.; Miss Anna J. Valentine, Bellefonte, Pa.; Arthur T. Wayne, Mt. Pleasant, S. C.; Louis Wessel, Butte, Mont.; Dr. Emma D. Wilcox, New York City; Miss Florence A. Wyckoff, Elmira, N. Y.; and Walter R. Zappey, Roslindale, Mass.

Drs. Allen, Dwight, Merriam and Richmond, and Messrs. Brewster, Ridgway and Stone, were reelected 'Committee on Classification and Nomenclature of North American Birds.' This

Committee was empowered to prepare a new edition of the Check-List for publication as soon as practicable.

PUBLIC SESSION. *First Day.*—The meeting was called to order by the President, Mr. Batchelder. An address of welcome was made by Prof. H. C. Bumpus on behalf of the President and Trustees of the American Museum of Natural History.

The papers read during the morning session were as follows:

'Some Unpublished Letters of Wilson and some Unstudied Works of Audubon,' by Witmer Stone. Remarks followed by Dr. Allen, and the author.

'The Evolution of Species through Climatic Conditions,' by Dr. J. A. Allen. Remarks followed by Dr. Bishop, Rev. H. K. Job, Messrs. Chapman, Elliot and Bent, and the author.

'Summer Birds of the Mt. Marcy Region in the Adirondacks,' by Elon H. Eaton. Remarks followed by Dr. Fisher.

'Pelican Island Revisited,' by Frank M. Chapman. Illustrated by lantern slides.

The papers of the afternoon were:

'Some Breeding Warblers of Demarest, N. J.,' by B. S. Bowdish. Illustrated by lantern slides. Remarks followed by Mr. Chubb, and the Chair.

'Notes on Wing Movements in Bird Flight,' by William L. Finley. Illustrated by lantern slides. Remarks followed by Dr. Palmer.

'The Status of Certain Species and Subspecies of North American Birds,' by Jonathan Dwight, Jr. Remarks followed by Messrs. Oberholser, Lucas, Elliot, and Dr. Allen.

'Wild-fowl Nurseries of Northwest Canada,' by Rev. H. K. Job. Illustrated by lantern slides.

In the evening the members of the Union, and their friends, met at dinner at the Hotel Endicott. After the dinner an informal reception was held at the American Museum of Natural History, with an exhibition of a new projection apparatus.

Second Day.—The meeting was called to order by the President. The papers read during the morning session were:

'Andr   Hesselius, a Pioneer Delaware Ornithologist,' by C. J. Pennock.

'The Probability of Error in Bird Migration Records,' by Witmer

Stone. Remarks followed by Prof. Cooke, Dr. Fisher, and the author.

'Some Observations on the Applicability of the Mutation Theory to Birds,' by Witmer Stone. Remarks followed by Drs. Allen and Bishop, Messrs. Oberholser, Brewster and Fuertes, and the Chair.

'The Song of the Hermit Thrush,' by Henry Oldys. Remarks followed by Mr. Fuertes.

'Impressions of English Bird-Life,' by Frank M. Chapman. Illustrated by lantern slides.

The papers of the afternoon were:

'Similarity of the Birds of the Maine Woods and the Pocono Mountains, Pa.,' by William L. Baily, followed by an 'Exhibition of Lantern Slides' by the same author.

'Discontinuous Breeding Ranges,' by Prof. Wells W. Cooke. Illustrated by lantern slides.

'The Principles of the Disguising Coloration of Animals,' by Abbott H. Thayer. Illustrated with experiments and slides. Remarks followed by Mr. Eaton and the author.

The Chair announced that the afternoon session the following day would be held in the Museum of the Brooklyn Institute of Arts and Sciences.

Third Day.—The meeting was called to order by the President.

The following Committees were appointed by the Chair: 'Revision of the A. O. U. Code,' Dr. J. A. Allen, Chairman, Dr. Theo. N. Gill, H. W. Henshaw, H. C. Oberholser, W. H. Osgood, Dr. C. W. Richmond and Witmer Stone. 'Bird Protection,' Dr. A. K. Fisher, Chairman, D. G. Elliot, Dr. T. S. Roberts, E. W. Nelson, and Dr. C. W. Richmond.

The papers of the morning were:

'The Collection of Birds in the New York Zoölogical Park,' by C. William Beebe.

'A Contribution to the Natural History of the English Cuckoo, with a review of the Literature on the Subject,' by Dr. Montague R. Levenson.

'Plumages and Status of the White-winged Gulls of the Genus *Larus*,' by Dr. Jonathan Dwight, Jr.

'A Contribution to the Ornithology of South Carolina, pertaining chiefly to the Coast Region,' by Arthur T. Wayne. In the

absence of the author the paper was read by Mr. William Brewster.

'Should Bird Protection Laws and their Enforcement be in the hands of the National Government?' by Otto Widmann. . Read by Dr. Palmer, in the absence of the author.

'A Lapland Longspur Tragedy,' by Dr. Thos. S. Roberts. Illustrated by lantern slides. Remarks followed by Drs. Fisher and Bishop.

The afternoon, and final, session was held at the Brooklyn Institute of Arts and Sciences, with Frederic A. Lucas, Curator-in-Chief of the Museum of the Brooklyn Institute, Chairman. On behalf of the Trustees he welcomed the Union to the Institute.

The papers read were:

'The Hoatzin and other South American Birds' (with exhibition of specimens), by George K. Cherrie. Remarks followed by Messrs. Dutcher, Beebe, Fuertes, the author, and the Chair.

'Among the Water Birds of Southern Oregon,' by William L. Finley. Illustrated by lantern slides. Remarks followed by Drs. Bishop and Fisher, Rev. H. K. Job, Messrs. Dutcher, Eaton and Fuertes, Mrs. Chapman, and the author.

At the conclusion of the papers there was an informal gathering in the office of the Curator-in-Chief, with refreshments provided by members of the Executive Committee of the Institute. Afterwards an opportunity was given to view the collections of the Museum.

On Friday, November 17, after adjournment of the Union, and upon invitation of the New York Zoölogical Society, many members visited the Aquarium and the New York Zoölogical Park. They were received and entertained by Directors Hornaday and Townsend, and Curator Beebe.

The next meeting of the Union will be held in Washington, D. C., commencing November 12, 1906.

JNO. H. SAGE.

Secretary.

GENERAL NOTES.

Leach's Petrel inland in Massachusetts.—A boy picked up a Leach's Petrel (*Oceanodroma leucorhoa*) on one of the streets in Clinton, Mass., Sept. 27, 1905. The bird was alive and apparently uninjured, but it refused to eat anything and died October 2. When it was skinned, a wound was found on the head, as if the bird had flown against a wire. This may explain why it was so easily caught, when apparently there was nothing the matter with it. The town of Clinton is thirty-five miles from the sea. The bird is now in the Thayer Museum.—JOHN E. THAYER, *Lancaster, Mass.*

The Name of the Western Sandpiper.—The Western Sandpiper (*Ereunetes occidentalis*) was described in detail and with accuracy by Lawrence in 1864 (Proc. Acad. Nat. Sci., 1864, p. 107), with the habitat, "Pacific Coast; California, Oregon."

Heteropoda mauri was named, but not described, by Bonaparte in 1838, in his 'Geographical and Comparative List of the Birds of Europe and North America' (p. 49). Its distribution is given as "South and Central parts [of North America]," in comparison with "America generally" for his *H. semipalmata* Wilson (= *pusilla* Linn.). The next reference to the species, by Bonaparte, is in the 'Compte Rendu' for 1856, p. 596, in a nominal list of the Scolopacidae, where there is no description nor indication of locality beyond the inclusion of the species in the list of 'American' species, and the citation, in parenthesis, of "*cabanisi*, Licht." and "*semipalmata* Gundl."

In the same year, Gundlach (Journ. f. Orn., Nov. 1856, pp. 419, 420), apparently for the first time, described the species, basing his description on a series of 5 specimens shot in Cuba, in winter, from a flock of large birds. He distinguished two species of *Ereunetes* in Cuba, a small and a large one. The small one he at first considered to be a new species and described it, in 1850, in Lembeye's 'Aves Cuba,' as *Hemipalma minor*, but later, in 1856, he identified it with *Tringa semipalmata* Wilson, and adopted Bonaparte's name *Heteropoda mauri* for the larger one. He says the two forms are very similar in coloration, but that one is much larger than the other, with very much longer bill and tarsus. He expressed himself in this connection as not having the least doubt of their specific distinctness. He gave the length of the bill in three specimens of the large form as, respectively, one inch, eleven twelfths of an inch, and ten and one third twelfths, as against nine and three-fourths twelfths in the small form; while the length of the tarsus was as ten and three-fourths twelfths to ten twelfths. These measurements of *mauri* are fully up to those given for *occidentalis* by Ridgway, in Baird, Brewer and Ridgway's 'Water Birds of North America' (Vol. I, p. 207).

As *Ereunetes occidentalis* is of frequent occurrence in the Atlantic coast States, particularly in Florida, and evidently also in Cuba, and as the name *mauri*, as given standing by Gundlach, antedates *occidentalis* by eight years, it appears that Dubois (Synopsis Avium, p. 949) was quite justified in bringing *mauri* forward as a substitute for *occidentalis*, and the form should stand as *Ereunetes mauri* Gundlach.—J. A. ALLEN, *American Museum of Natural History, New York City.*

Additional American Records of the Ruff.—In 'The Auk' for October, 1905, pp. 410, 411, Mr. Ruthven Deane published a list of 16 American specimens of the Ruff (*Pavoncella pugnax*). To this list at least six additions should be made, one for South America, two for Barbados, two for Rhode Island, and one for Massachusetts. Five of these records have already been published and for the privilege of recording the sixth bird, a specimen from Massachusetts, I am indebted to Mr. Deane and Mr. John E. Thayer. This specimen, a female, shot by Alfred Dabney on Nantucket, late in July, 1901, was mounted, and is now in the Thayer collection at Lancaster, Mass.

The data for the early records of the Ruff leave much to be desired in the way of completeness. Giraud in 1844 mentioned the fact that "the Ruff, Wheatear, Skylark, and other foreign species have been found on Long Island," but apparently thought that they were birds which had escaped from captivity (Birds of Long Island, p. 309). The first positive record of the species in America is probably that for Barbados, noted by Schomburgk in 1848, instead of that for New Brunswick, published by Boardman in 1862, as stated by Mr. Deane, but in neither case is the exact date of capture known. The first record for North America is apparently the Long Island note published by Lawrence in 1852 in the 'Annals' of the Lyceum of Natural History. Prof. Baird in referring to the species in 1858 said: "The ruff has been so frequently killed on Long Island as to entitle it to a place among descriptions of North American birds, although it can not be said to belong to our fauna" (Pac. R. R. Reports, IX, p. 737). But the only bird in the list which represents those 'so frequently killed on Long Island' prior to 1858, is the Lawrence specimen now in the American Museum of Natural History.

The southernmost record for the species is indefinite both as to date and locality. It was based on 'an abnormally colored specimen' collected by H. Munzberg in 'Spanish Guiana' and submitted for examination with other specimens to Pelzeln, by H. E. Hodek, a taxidermist of Vienna. Pelzeln's notes on Hodek's specimens appeared in 'The Ibis' for 1875, but how much earlier the bird was killed is not known. In the Catalogue of Birds in the British Museum, Vol. XXIV, p. 506, Sharpe gives the locality as 'Dutch Guiana,' but Pelzeln, who uses the term 'Spanish Guiana,' states that it probably refers to the territory between the Upper Rio Negro and the Orinoco or the adjacent part of New Granada.

Careful search will probably bring to light several other records, especially of some of the birds taken on Long Island. For convenience of comparison the data for the six additions to Mr. Deane's list are appended in the same form as that adopted in his table:

Sex	Locality	Date	Collection	References
♀ ad.	Barbados, W. I.	Before 1848	British Museum	Schomburgk, Hist. Barbadoes, 1848, Feilden, Ibis, 1889, p. 494.
—	Spanish Guiana	" 1875	H. E. Hodek, Vienna	Pelzel, Ibis, 1875, p. 322.
♂ ad.	Graeme Hall Swamp, Barbados, W. I.	1878	British Museum	Feilden, Ibis, 1889, p. 495.
♀	Sakonnet Point, R. I.	July 30, 1900		Hathaway, Notes R. I. Orn., I, p. 20, 1900.
♀	Nantucket, Mass.	July, 1901	John E. Thayer	Palmer, Auk, XXIII, p. 98, 1906.
♀ im.	Point Judith, R. I.	Aug. 31, 1903.	Le Roy King, Newport, R. I.	King, Auk, XXI, p. 85, 1904.

T. S. PALMER, Washington, D. C.

Prolific Duck Hawks.—In the spring of 1898 Mr. George H. Burge of this place, at that time actively interested in the collection of eggs of our local birds, took two sets of eggs of the Duck Hawk (*Falco peregrinus anatum*) which seem worthy of record. In the preceding years he had taken several sets of four eggs each of this species at various places along the palisades of the Cedar River, five miles southwest of Mt. Vernon, and had even collected a set of five on April 12, 1895. This last nest-site was a small cavity, three and a half feet in length, and twenty feet from the top of a hundred and ten foot cliff. In 1898 this site was again occupied and on April 5 of that year Mr. Burge and an assistant took therefrom a set of six eggs, slightly advanced in incubation. One egg, and possibly two, appeared to the collector to be infertile. They are quite uniform in size and shape, averaging 49×39 mm., a little smaller than the average as given by Bendire. In color they are nearly typical, though perhaps somewhat light. A pinkish suffusion gives a peculiarly rich appearance to several of the eggs. About three weeks later the same collector took another set of six eggs from a narrow ledge on a sixty foot cliff a half mile farther down and on the opposite side of the river, the aerie being about thirty feet above the water. The eggs were fresh and without much doubt were from the same pair of birds which had shortly before produced the first set of six, the old site having been abandoned. The collector had the misfortune to find two of the eggs of this set crushed slightly in the nest, which probably explains his lack of interest in preserving the exact date of collecting. The eggs were saved in good, whole condition, however, and are the lightest colored specimens of this species which have ever come

under my notice, being very similar to a Sparrow Hawk's egg figured by Bendire (Life Histories of N. A. Birds, Vol. I, Pl. X, fig. 13). In size they average 50×41 mm. and are quite uniform.—CHARLES R. KEYES, *Mt. Vernon, Iowa.*

A Northern Record for the Swallow-tailed Kite (*Elanoides forficatus*) in Wisconsin.—I have recently examined a mounted specimen of this Kite, which was shot at Glidden, Ashland County, Wis., July 26, 1901, by Mr. William Blome of Chicago, and is still in his possession. The few previous records of this species in the State have been confined to the southern portion, while the specimen in question was taken within thirty-five miles of the Lake Superior shore.—RUTHVEN DEANE, *Chicago, Ill.*

Three Michigan Records.—AMERICAN GOSHAWK, *Accipiter atricapillus*.—I recently examined a fine immature female of this species shot by a boy on October 29, 1905, near Orion, Oakland Co., Michigan, which was sent in for mounting to L. J. Eppinger, the Detroit taxidermist. As far as my knowledge extends this is the first bird that has been taken in Oakland County, and the third record for southeastern Michigan, the first being taken near Plymouth, Wayne County, December 24, 1898 (Bull. Mich. Ornith. Club, 1898, 38). However, I have no doubt but that this species ranges through this section of Michigan in late fall and winter to a greater extent than the records demonstrate. Possibly some of the so-called winter records for *A. cooperi* are of this species. Mr. A. B. Covert tells me that an occasional bird finds its way into the taxidermists' hands at Ann Arbor, Washtenaw County.

AMERICAN BARN OWL, *Strix pratineola*.—Records of this species here are rare and irregular. I recently examined a bird taken in Greenfield Township, Wayne County, early in October, 1905. A. B. Covert informs me that he recently mounted a pair of these owls which were brought to him alive at Ann Arbor. The gentleman who brought in the birds stated that they had nested in his yard at Ann Arbor, during the present spring.

SAW WHET OWL, *Cryptoglaux acadica*.—A boy brought in one of these birds which he secured in Detroit on October 24. It is strange that nearly every specimen of this bird that I have examined has been taken by the omnipresent small boy. Personally I have met with but one bird, in December, 1889.—BRADSHAW H. SWALES, *Detroit, Mich.*

Another Large Flight of Snowy Owls.—Unusually large flights of Snowy Owls (*Nyctea nivea*) to and beyond our latitude, used to occur every eight or ten years, but it was only three years ago when great numbers visited Canada and the New England and Middle States. We are now taken quite unawares by another flight, which will possibly exceed in numbers that of the winter of 1902-03, as the migration has started somewhat earlier. I have not had opportunity as yet to canvass any

extensive territory but I find more records for Illinois than in previous years. I have examined twenty-eight specimens so far (Dec. 9) received by two of our Chicago taxidermists, the earliest record being Oct. 31. Some of these specimens came from Cook and Lake Counties, Ill., Ironwood, Mich., and from a few localities in Wisconsin. On Nov. 17 I saw a specimen on the "Skokie" marsh, near Highland Park, Ill. After flying a few hundred yards, it alighted on the top of a large haycock where it remained for an hour. In Maine several have been taken near Bangor, and five were sent in to Portland Nov. 14, all taken on Richmond Island, off Scarborough Beach. Mr. M. Abbott Frazar of Boston, writes me under date of Dec. 2, that his establishment had received about twenty specimens, the earliest date being about Nov. 20. They came from different localities on Cape Cod. Mr. H. S. Hathaway of Providence, R. I., reports five as taken in that State on Nov. 16 and 18. About two thirds of the owls which I have examined were large dark females. Some of the males were in fairly light plumage, but none approached the pure white dress in which they are sometimes found.—RUTHVEN DEANE, *Chicago, Ill.*

The Downy Woodpecker.—For more than a year past a Downy Woodpecker (*Dryobates pubescens*) has made his home in the backyard of the house where I live. He was induced to stay last winter by a piece of fat meat which was nailed to one of the trees. In the early winter he drilled a hole in a dead cherry limb about six feet from the ground, and I believe used it all winter as a night refuge. During the past summer it was used occasionally by the same bird, though not with any regularity. About sunset he flies into the hole, which is only four inches deep, and sits there with his head out watching the surroundings until dark. The hole is only about twenty feet away from a back porch of the house that is in constant use, and the bird does not seem to be annoyed by his proximity to the persons sitting there.

On my walks through the woods this fall I have noticed a number of newly drilled holes in dead stumps which look as if they had been made by the woodpeckers for winter refuges. This is a habit of the bird which does not seem to have been noted in the natural histories.—R. P. SHARPLES, *West Chester, Pa.*

Breeding of the Prairie Horned Lark in Eastern Massachusetts.—As a supplement to Dr. C. W. Townsend's note on the discovery in August, 1903, of young *Otocoris alpestris praticola* at Ipswich, Mass., where they had undoubtedly been bred (Auk, XXI, p. 81, Jan., 1904), it may be worth while to record that on Sept. 4, 1905, I obtained two birds of this subspecies, shot in my presence by a gunner (who mistook them for plover!) out of three which were flitting about a stony beach and a grassy hillside at Ipswich. One of these birds is apparently an adult, but the other is a young bird in juvenal plumage just moulting into the first

winter plumage. They are now in Dr. Townsend's collection. As further evidence of the eastward spread of the breeding range of the Prairie Horned Lark, I may add that on Aug. 16, 1903, I saw a lark, doubtless of this subspecies, with a spotted breast and a yellowish bill, evidently in the juvenal plumage, at Natick, Mass. This bird was seen a few days earlier at the same place by Mr. R. B. Worthington of Dedham, Mass.—FRANCIS H. ALLEN, *West Roxbury, Mass.*

Moult of the Snowflake (*Passerina nivalis*).—Dr. Jonathan Dwight's review¹ of Mr. Frank M. Chapman's article on the 'Changes of Plumage in the Snowflake' is concluded in these words: "The Snowflake is one of the interesting species that undergo but one moult in the year." As this species is believed *not* to have a spring moult — either complete or partial — I will show that there is at least a partial moult. A specimen in my collection, ♂ ad. (Smithsonian No. 100,688), April 1, 1884, Fort Chima, Ungava, collected by Mr. L. M. Turner, and which I received in exchange from Mr. Ridgway, clearly shows moult in a semicircle on the jugulum; the auriculars were also being moulted. This specimen, although taken as early as April 1, has almost attained the adult nuptial plumage.

Another quotation from Mr. Chapman's paper by Dr. Dwight is as follows: "'The male has the feathers of the head, nape and rump basally white, while in the female they are basally black',— this difference holding at all seasons of the year." Upon examining the specimens of this species in my collection from New York, Minnesota, Point Barrow, Alaska, and Ungava, I find that the *base* of the feathers of the head, nape and rump are the *same* in both sexes.—ARTHUR T. WAYNE, *Mount Pleasant, S. C.*

The Redpoll Breeding on the Magdalen Islands.—It may be of some interest to know that a nest of a Redpoll (*Acanthis linaria*) was found on Grosse Isle, Magdalen Islands, this year by Mr. H. H. Hann and the writer of this note, while on a short trip to the Islands in June of this year. It was the day before we left Grosse Isle that the nest was found, and most of our belongings were packed for our homeward journey but nevertheless we decided to spend this last day, June 29, on the hill a little to the east of the settlement. About one third the way up this hill, amid the spruce trees, we discovered a small nest in a spruce about six feet from the ground. It was placed near the trunk of the tree and was a dainty affair, neat and rather compact, composed of coarse grass and a goodly quantity of deer moss lined with feathers, about three and one half inches in diameter, and containing four young birds four or five days old. After we had waited there for some time both parent birds returned to the nest. There was no mistake in the identification of these active little birds, with their

¹ 'The Auk,' Vol. XIII, April, 1896, pp. 165, 166.

dark throats and red foreheads, the male with a conspicuous red patch on his breast.

It might also be of interest to note that the Scaup Duck (*Aythya marila*), found quite abundantly on the Magdalens by both Rev. C. J. Young and the Rev. H. K. Job, on their visits to the Islands, were this year no where to be found and the islanders could not account for their sudden disappearance.—J. P. CALLENDER, *Summit, N. J.*

Nesting of the Junco in Eastern Massachusetts.—On May 25, 1905, in the Middlesex Fells, near the Medford border, I ran across a pair of Juncos (*Junco hyemalis*) with food in their bills. I watched them and the female soon went to the nest. It was situated under the edge of a tussock of grass, in an open space in the woods, and contained four well-grown young.

The nearest breeding record I have yet found is Fitchburg, mentioned by Messrs. Howe and Allen in their 'Birds of Massachusetts'.—R. S. EUSTIS, *Cambridge, Mass.*

Possible Breeding of Junco hyemalis in Essex County, Mass.—On Sept. 2, 1905, I saw at Boxford, Mass., a young Junco in the juvenal plumage, with streaked back, breast, and belly. The bird was not taken, but I watched it for five minutes, part of the time within ten feet, and fully identified it. Dr. C. W. Townsend (Birds of Essex County) mentions seeing a Junco at Groveland, Mass. (just north of Boxford), Sept. 3, 1904, but he tells me that it was identified from an electric car, and he does not know whether it was an adult or an immature bird. These dates are much earlier than any migration dates known to me. Messrs. Howe and Allen (Birds of Massachusetts) give Sept. 18 as the earliest fall date, and Dr. Townsend gives Sept. 26 for Essex County. As far as I can learn, moreover, the Junco has never been taken in the first plumage at any distance from its breeding grounds, and Dr. G. M. Allen writes me that he has no breeding records for this bird from Southeastern New Hampshire. It is almost impossible, too, that the Boxford bird could have been one of the brood raised in the Middlesex Fells last summer, and recorded by Mr. R. S. Eustis in this number of 'The Auk', for Boxford is some eighteen miles from that locality and nearly due north. All these facts seem to point to the conclusion that the Junco may prove to be at least an occasional, thought doubtless an extremely rare, breeder in Eastern Massachusetts.—FRANCIS H. ALLEN, *West Roxbury, Mass.*

The Lark Sparrow in Massachusetts.—On August 12, 1905, at Ipswich, Massachusetts, I observed at close range a Lark Sparrow (*Chondestes grammacus*). This makes the sixth record of this species for the State, and the fourth for Essex County. Nearly a year before this, on August 21, 1904, I took at Ipswich an adult male Lark Sparrow (Birds

of Essex County, p. 268). It has occurred to me that stragglers in the migrations along our Eastern Coast may not be so very rare, but that they are overlooked, being mistaken for Vesper Sparrows, owing to the white outer tail feathers. In both of the above instances, however, the slightly fan-shaped tail, and the fact that the white was not confined to the two outer feathers, as in the Vesper Sparrow, attracted my eye. The characteristic marking on the side of the head in the Lark Sparrow, seen with a glass within thirty feet, made the diagnosis in the second case absolutely certain.—CHARLES W. TOWNSEND, M. D., Boston, Mass.

A Male Golden-winged Warbler (*Helminthophila chrysoptera*) Mated with a Female Blue-winged Warbler (*Helminthophila pinus*) at Bethel, Conn.—On June 11, 1905, Robert Judd, H. C. Judd and myself were walking through a patch of second growth when our attention was attracted by the sharp chipping of two birds, which we found to be a male *Helminthophila chrysoptera* and a female *Helminthophila pinus*.

After nearly two hours of searching and watching I flushed the female *pinus* from the nest, which contained five young about two days old. During this time both birds were very much excited. These two birds were the only *Helminthophila* seen or heard in the vicinity.

The nest was placed on the ground in a bed of leaves at the foot of a bunch of chestnut sprouts and was concealed by a few grasses. The grass was not as thick as is usual in typical nesting sites of *H. pinus*. The male *chrysoptera* frequently flew into this bunch of chestnut sprouts while we were watching the two birds.

June 16, Robert Judd and myself again visited the nest and found the young birds had left it. Both of the old birds were around and were very much excited.

After watching them for some time we found one young bird which the female was feeding. This was apparently the only young there was left and it was in typical plumage of young *H. pinus*. We caught the young bird, and among the Chewinks, Yellow-breasted Chats, Indigo Buntings, Field Sparrows, etc., that were attracted by its cries of distress, was a male *H. pinus*, who was promptly driven off by the male *H. chrysoptera*. This was the only male *pinus* seen near the nest at any time. We gave the young bird his liberty again and watched the two old birds for some time. The male was not seen to feed the young bird, but he flew uneasily from bush to bush, chipping frequently.

On account of thunder storms and heavy rains we were unable to make any further observations until June 23. On this date neither the old birds nor young could be found, although we searched thoroughly for several hours. Possibly the young were destroyed by the heavy rains, or some predatory mammal may have finished them. A further search on June 25 and July 9 also failed to show any trace of them.—JESSE C. A. MEEKER, Danbury, Conn.

The Cape May Warbler in Litchfield County, Conn.—As the Cape May Warbler (*Dendroica tigrina*) is so rarely reported from this State, it may be of interest to record my capture of a male of this species on May 8, 1905, near the village of Litchfield, Conn. It was with a large flock of Black-throated Green Warblers in a row of Norway spruces bordering the cemetery of the village.—E. SEYMOUR WOODRUFF, *New Haven, Conn.*

A Third Record for the Prairie Warbler in Canada.—On September 5, 1905, while collecting on the east shore of Point Pelee, Essex County, Ontario, I took a young male Prairie Warbler (*Dendroica discolor*). It is now No. 314 in my collection. This is the third record for Canada, the other two being taken at Toronto, Ont., in 1900.—N. B. KLUGH, *Macdonald Institute, Guelph, Ont.*

The Carolina Wren a Summer Resident of Ontario.—On September 5, 1905, while collecting in a thicket on the east shore about two miles from the end of Point Pelee, Essex County, Ont., I secured a young male Carolina Wren (*Thryothorus ludovicianus*). This skin is now No. 315 in my collection, and is the second record for Canada. The first Canadian specimen was taken in February, 1891, at Forest, Ont., by Mr. Montague Smith, and is recorded by mistake as being taken at Mount Forest, Ont., in McIlwraith's 'Birds of Ontario,' p. 392. At the time I collected the specimen above recorded I saw another Carolina Wren. Both were singing and creeping about very rapidly among the underbrush.

On September 6, Mr. P. A. Taverner and I visited the thicket above referred to. Mr. Taverner took a young male which is now No. 299 in his collection, and I secured two fledglings, both males, which are now No. 300 in Mr. Taverner's collection and No. 316 in my collection. Besides those taken we saw another, either an adult or a bird in the first winter plumage.

The two birds first taken were evidently members of an earlier brood, and the two last members of a later brood. The presence of these fledglings constitutes the first breeding record for Canada.—N. B. KLUGH, *Macdonald Institute, Guelph, Ont.*

First Capture of Townsend's Solitaire (*Myadestes townsendi*) on Long Island, New York.—A male of this species was captured at Kings Park, November 25, 1905, by Mr. J. A. Weber who kindly put the bird into my hands for identification. It appears to have wandered far from its habitat, the Rocky Mountains, although there is the possibility of its being an escaped cage-bird. While the freshness of plumage and normal length of claws do not preclude this possibility, the species is not, I am told, one that is caged for sale, and the specimen in question seems to have as good a claim to be recorded as have other unexpected waifs in other

localities. A specimen of Townsend's Solitaire has been taken as far east as Illinois, December 16, 1875 (Bull. N. O. C., I, 1876, p. 40), the late date suggesting, as does Mr. Weber's bird, some connection between autumn storms and the wafting eastward of purely accidental western visitors like the one now first recorded for New York.—JONATHAN DWIGHT, Jr., M. D., *New York City*.

Two Birds New to the Avifauna of Kansas.—1. GROOVE-BILLED ANI (*Crotophaga sulcirostris*). A single specimen of this species was captured by a farmer near Emporia, in Lyon County, about November 1, 1904. It is in the collection of the Kansas State Normal School and was reported to me by Prof. L. C. Wooster of that institution. This is, I think, the first instance known of the occurrence of this bird north of the Lower Rio Grande in Texas.

2. RED PHALAROPE (*Crymophilus fulcarius*). A single specimen of this species was shot by Edward E. Brown, assistant secretary of the University of Kansas, on November 5, 1905, at Thacher's Lake, about four miles from Lawrence, in Douglas County. A small flock arose from water about one foot in depth among the weeds, emitting a shrill piping cry. Dr. Coues in his 'Birds of the Northwest,' says: "I introduced this species, although it has not yet been found in the Missouri region, as one which unquestionably occurs at times, and in order to complete an account of the family. It is more particularly a maritime bird.... It is mentioned by Mr. Wheaton among the birds of Ohio, and by Mr. Ridgway among those of Illinois."

These two additions raise the number of species and varieties of Kansas birds whose actual capture has been verified by me to 349.—FRANCIS H. SNOW, *University of Kansas, Lawrence, Kans.*

Some More Michigan Records.—PROTHONOTARY WARBLER (*Protonotaria citrea*). A floating newspaper paragraph called my attention to an alleged case of this bird's breeding in a letter box in the city of Battle Creek this summer. On writing for further particulars, I find the report well confirmed. I received an excellent description of the bird from Mrs. Inez Adams, who had many opportunities for observing the bird through the summer, and who forwarded the nest itself to me later. It agrees perfectly with all descriptions of the nest of this species and is, of course, radically different from the structure built by the Yellow Warbler, which is the only bird that could possibly be mistaken for *P. citrea*. The letter box in question was fastened to a veranda post of the residence of Mrs. C. A. La Pierre, No. 35 Coldwater St., and it was by her kindness that I was furnished with the following particulars, and I can do no better than to quote her words.

"About the 16th of May one of the birds came in at the back door and flew through to the parlor, fluttering there against one of the large win-

dows. I hurriedly opened the front door to give her her liberty; which she seemed in no particular hurry to take advantage of, flying about the room and finally out into the large elm which overhangs our porch. In a few moments she was back again sitting on the porch box, peering inquisitively in at the window where I was at work. I took no notice of the birds until on the 19th, returning from a day's outing in the country, I found my letter box filled with moss and grass. Still, never thinking of a bird building there, I threw it away, supposing it to have been placed there by the children during my absence. A few mornings later our mail carrier, finding the box full, threw it out again upon the porch floor. It was then that I discovered it to be in the form of a nest and replaced it. That same evening, or early next morning, there was one tiny speckled egg laid, for I found it there at six A. M. Each morning, by six o'clock, there would be another egg that had not been there the night before, until there were five, and then she began sitting. We provided a temporary box for the mails, and placed a large fern on a table in front, thus affording what protection we could during the hatching process.

"Next door to us lives a small boy who, with several companions, play and shout from early till late, often running across our lawn and up on our porch. The street is a very busy one and the house stands close to it, so you can imagine what difficulties the little bird had to contend with and with what courage and persistence she managed to make her nest. She was often looked in upon by lamp light, and had bills thrust in the nest before I placed the fern, and was obliged to wait until I removed them, before she could return. They were both so tame that I could often call them to the lower branches of the tree, where they would sit and 'talk back,' but not when others were present.

"They hatched the five eggs and got their young into the tree without anything happening to distress them, and I only wish I could picture their joy, on the morning when the young were able to fly. The male drew me to the door with his loud singing, and I found him perched upon my hammock rope, warbling with a sweetness I had no idea he possessed. He would, occasionally, leave the rope and suspend himself in the air on a level with my head, just outside the door, looking at me all the time. I opened the door, thinking he wanted to come in, as he often had done, but he alighted on the top of the half open screen and continued to sing. I went out, and there was the first of the youngsters on the edge of the box, preparing to make the trip from the nest to the tree. On top of his head was a ball of fuzz like that he had worn previous to getting his feathers, making him look very comical indeed. There was only one wee bird in the nest that night and by the following afternoon all had disappeared as suddenly as they had come and,—listen as I would, I could not even hear a note of the song I had learned to love by association with the bird that sang it.

"They were very cleanly in their habits, making no litter as I expected they would. When the porch was scrubbed with a brush, or even washed

with a hose, they remained undisturbed, and when I sat in the hammock they would change their course of flight from the nest and pass close to my head, and even come into the kitchen wash-day when the room was full of steam."

The above is the interesting account of these birds furnished me by the mistress of the house where they raised their brood. From the light it throws upon the habits of this species when under the influence of unusual environment, I deem it worthy of record. A few rods back of the house flows the Kalamazoo River, bordered by a fringe of willows, and it was doubtless these neighboring conditions that brought the birds to this peculiar nesting site.

AMERICAN HAWK OWL (*Surnia ulula caparoch*). Nov. 19, 1905, a fine-plumaged bird of this species was brought in to Mr. Eppinger to be mounted. With it came the information that it had been killed at Port Huron, St. Clair Co., Mich., and that several more had been taken in that neighborhood. This last statement I have been unable to verify with exact certainty as yet. The bird had not been long dead, as the lice upon it were still lively and crawling about. It was a male and had probably been killed the day before.

GREAT BLUE HERON (*Ardea herodias*). Among other recent interesting occurrences was the unusual numbers of this species taken late this fall. During the first week and a half of November Mr. Campion received eight of them from different persons to mount, all from the vicinity of the Point Mouille Marshes. All were immatures but one. This bird does not usually linger here as late as this in such numbers.—P. A. TAVERNER, *Detroit, Mich.*

Some Nebraska Bird Notes.—*Cinclus mexicanus*. DIPPER.—On page 680 of the recently published third volume of his 'Birds of North and Middle America,' Mr. Ridgway cites the reference by Mr. W. W. Cooke (Bird Migr. Miss. Valley, p. 264) to this species as abundant in Otoe County, Nebraska, and in a footnote points out that this record must be an error since the locality in question is bordering on the Missouri in the extreme eastern part of the State, in "the prairie region, a country different as possible from that inhabited by the present species." In this conclusion Mr. Ridgway is entirely correct, and it is perhaps worth while to point out the origin of the error. Mr. Cooke, as he states, obtained this record from Prof. Samuel Aughey's paper on the food habits of Nebraska Birds (Rept. U. S. Ent. Comm., Appendix II, p. 16) where under the name "*Cinclus mexicanus*, Sw.," he says: "Rare in Nebraska. Seen it for the first time in August on the Niobrara, about seven miles from its mouth, in a dense timber. I was near enough to observe it eating locusts. Hon. J. Sterling Morton says that they are abundant in Otoe County." Examining Aughey's paper it will be seen that in juxtaposition to the technical name of the Dipper is the common name "Western Bluebird,"

and it is clear from the locality and habitat mentioned that the record belongs with the common name, having been inadvertently inserted under *Cinclus* by the printer, while the note intended for the Dipper was entirely crowded out by the same individual. Similarly, the note following, on the Blue-gray Gnatcatcher, will be found also out of its proper place, being inserted under the family Cinclidae. The record of the Western Bluebird from the Niobrara made by Aughey himself is probably a valid one, but the reported abundance of the species in Otoe County is almost certainly a misidentification by Mr. Morton for the common Bluebird which was and still is abundant there.

***Progne subis*.** PURPLE MARTIN.—This year I have seen the Purple Martin commonly across the State; at Imperial June 22, at Culbertson June 23–25, at Stratton June 28, and at Glen, Sioux County, August 5–23. Our previous westernmost record was from North Platte.

***Spizella socialis arizonæ*.** WESTERN CHIPPING SPARROW.—The suspicion expressed on p. 88 of the 'Birds of Nebraska' has proved true. A breeding pair of the Chipping Sparrow obtained by me at Glen, Sioux County, August 6, 1905, are very decidedly of the western race. These specimens substantiate the recording of this bird as another addition to our State list.

***Cyanocitta stelleri annectens*.** BLACK-HEADED JAY.—The second record for the State rests upon a bird seen by Prof. Bruner and myself in Warbonnet Cañon, Sioux County, August 9, 1905.

***Corvus brachyrhynchos*.** CROW.—This bird is increasing in Sioux County. The Glen flock mentioned in the 'Birds of Nebraska' has this year increased to twenty-eight.

***Selasphorus platycercus*.** BROAD-TAILED HUMMINGBIRD.—A pair of these hummers was seen each day about our camp at Glen, August 18–22, feeding at *Cleome* flowers. I feel quite sure that they bred in the vicinity this year.

***Actitis macularia*.** SPOTTED SANDPIPER.—Additional western Nebraska records for this species are a pair seen on a sandbar near Stratton, June 28, evidently breeding near, and three seen at a small pond near Fort Robinson, August 23, in company with several Solitary Sandpipers.—MYRON H. SWENK, *Dept. Entomology and Ornithology, University of Nebraska*.

Should Bird Protection Laws and their Enforcement be in the Hands of the National Government?—There are several reasons why the protection of birds should be in the hands of the National Government.

In the first place, the law which protects bird life from wanton destruction should be uniform throughout the country, and no State or Territory should be without it. As the formulating of the law is a task which requires some knowledge of birds and their habits, and since this knowledge cannot be expected to be possessed by State legislators, the wording of the law

should not be entrusted to State legislatures liable to commit grave errors. For instance, by substituting the word Chicken Hawk for Duck Hawk or Peregrine Falcon the Missouri legislature has sealed the doom of our best mice destroyers, the Marsh and Rough-legged Hawks and the different Buteos, all of which are universally known by the name of chicken hawk.

But while the making of the law is of importance, the enforcement of it is still more important and should not be left to a State game warden who may or may not be in sympathy with it, possibly being a very good fish and game warden, but a very poor protector of birds generally. Even if he should be an enthusiastic bird protectionist, the work itself must chiefly rest in the hands of his deputies and of the local police as ex officio game wardens, men who very often are not in sympathy with the law and would not want to incur the enmity of their fellow citizens for the sake of a law for which they generally care but little or not at all.

We are all agreed to admit that wild birds do not belong to the owner of the ground on which they temporarily alight or over which they chance to fly, but we have not questioned the proprietorship of the State in which the bird is found, though we know that with few exceptions birds travel through a number of States in their migrations and generally spend the winter in one State, the summer in another. It is plain to see that the birds are the guests of the Nation, and that it is therefore the sacred duty of the Nation to give them their protection while with us. As with the landbirds so with the seabirds which come to our shores to breed or fly along our coasts to feed, or in their migrations. They are certainly as much the guests of the country as the landbirds and entitled to protection by the Nation as a whole. Their fate should not be left to the benevolence of private persons. A task so difficult and important should rest on the shoulders of the National Government which alone is able to give the needed protection in full measure. A Nation that spends hundreds of millions to protect her citizens and their rights and interests should be able to give full protection to its feathered wards, for as such must we regard these defenseless creatures. We owe it to posterity to do everything in our power to preserve the beautiful in creation, and not least among that are the birds. It is not only their economic, but also, and much more so, their esthetic value which has to be considered when we form and give judgment on the relation of birds to man and on their right to live. This esthetic worth may have played a small part in the past among the poorly educated masses of our rural population, but it will be of immensely more importance for the better educated and cultured population of the future to which bird life will be a great relief of the monotony of country life already threatening to become almost unbearable by the disappearance of trees, shrubs, wild flowers, and everything else pertaining to beauty and loveliness in Nature.—OTTO WIDMANN, *St. Louis, Mo.*

RECENT LITERATURE.

Stejneger's 'The Birds of the Genus *Cinclus* and their Geographical Distribution.'—In this paper of ten pages¹ Dr. Stejneger considers the affinities, probable place of origin, and the geographical distributions of the Dippers—an oscinine type modified to assume the rôle of an aquatic bird, and hence presenting puzzling relationships. "Even at this late day there is no absolute certainty as to their most intimate relationships. . . . The majority of ornithologists of to-day divide upon the question whether the dipper is more closely allied to the thrushes (*Turdidæ* in the wider sense) or to the wrens." Contrary to his former belief, the author is now "convinced that *Cinclus* has sprung from the same root" as *Sialia* and *Saricola*, and "that its many peculiarities are mere adaptations to its aquatic habits." Furthermore, instead of assigning to it a neotropical origin, as he did in 1885, he now "has no hesitation in affirming that *Cinclus* is of palaearctic origin"; or, more definitely, that it originated in "that enormous and ancient plateau and mountain region north of India and east of 90° east longitude. . . . From this center the dippers radiated wherever high enough mountain ranges, or otherwise boreal conditions, permitted them to push forward their colonies." As they are mountain and torrent loving birds, their distribution is peculiar; they inhabit the high mountain systems of the Palaearctic subregion from the Atlantic to the Pacific, but in the New World "are confined to the boreal zone of the long Cordilleran chain from Alaska to the Argentine Republic," extending in South America eastward to eastern Colombia, but in North America not ranging east of the Rocky Mountain system.

He would place the origin and beginning of the dispersal of the group "not later than the dawn of the Tertiary"; and assumes that they reached North America from Asia by the land bridge believed by geologists to have existed somewhere about Bering Sea, at about the time of the uplift of the mountain ranges that parallel the pacific coast from Alaska to Patagonia. Although a wide sea is supposed to have existed across what is now Panama during the early Tertiary, a land bridge joined North and South America early enough for the dipper to have "probably gained a foothold in the Andes before the advent of the Pliocene." "The dipper which reached farthest south (*Cinclus schulzi*) seems to have become most modified, for it has acquired a light rufous throat, a character entirely unique in the genus."

The place of origin and relative antiquity of the several leading types of the group is further considered, and also the influence upon them of isola-

¹The Birds of the Genus *Cinclus* and their Geographical Distribution. By Leonhard Stejneger. Smith. Misc. Coll. (Quart. Issue), Vol. XLVII, pp. 421-430, April 5, 1905.

tion and other conditions. Some thirty or more forms,—species and races — are now recognized, and to facilitate their discussion a synopsis of them, in the form of a key, with their distribution, is given in a footnote. The group, with its peculiar geographical distribution and its several rather distinct types of coloration offers a tempting subject for speculation, which our author has utilized in a most interesting and fairly conservative way, emphasizing at the same time the great dearth of material at present available for study in relation to many of the forms. As Dr. Stejneger says: "All these questions are of the utmost importance and interest, but with the present utterly inadequate material at the disposition of the ornithologist, it is scarcely possible to more than lift a corner of the veil. Until the true inter-relations of these birds have been ascertained; until the distribution of the forms thus established has been actually mapped in considerable detail; and until the results thus gained have been verified by correlation with the physiographic features of the country in the field by competent observers; until then we shall have nothing but guesses. . . . I need only mention that no less than nine different forms of palæarctic dippers have been described during the last two years, the scant material upon which these are mostly founded being distributed among six different museums." Nor is the case of the dippers an isolated instance; it is merely a forcible illustration of the condition of such problems in general, not only in the palæarctic field, but over the greater part of the world's surface.—J. A. A.

Scott 'On the Probable Origin of Certain Birds.'¹—The birds here referred to, nine in number, are all included in the 'Hypothetical List' of the A. O. U. Check-List, and are the following: *Tringa cooperi* Baird, *Acanthis brewsteri* Ridgw., *Emberiza townsendii* Aud., *Helminthophaga lawrencei* Herrick, *H. leucobronchialis* Brewster, *Sylvia carbonata* Aud., *Sylvia montana* Wilson, *Muscicapa minuta* Wilson. Two of them, *H. lawrencei* and *H. leucobronchialis*, are discussed at length, the other seven being disposed of in few words, his conclusion respecting them being that "the law of parsimony [whatever that may be] compels me to consider these forms as mutations (which were not perpetuated) from *species still existing* which I have, in most cases, been able to indicate." Of four of them the unique type specimen is still extant; the other three are known only from the works of Wilson and Audubon.

In accounting for the origin of all of these nine forms he resorts to de Vries's hypothesis of mutants. In considering the two forms of *Helminthophila*—*lawrencei* and *leucobronchialis*—he emphatically rejects the current hypothesis of hybridity to account for their origin, for, he says, "though hybrids do occur among wild birds, they can be considered at

¹On the probable Origin of Certain Birds. By William E. D. Scott. Science, N. S., Vol. XXII, pp. 271–282, Sept. 1, 1905.

best as only casual, and the infertility of hybrids, especially among the higher animals, is too well known to need further comment here"! He believes that in the case of these two forms, "we have examples of two separate and distinct 'mutations' from a common parent stock or species. That is," he continues, "I believe that *H. pinus*, early in the last century became unstable as a species and began to throw what must be considered as 'mutants,' taking de Vries's definition of the word." He concludes with the following: "In the light of the evidence set forth only one answer can be made to the question as to the part that the process defined by de Vries as mutation is playing among higher animals to-day. Beyond doubt we have witnessed the birth of new species of birds during the past seventy years. Moreover, some of these new species have flourished so as to have become a salient part of the bird fauna in the region where they occur and where they were unknown to skilled ornithologists, who carefully studied these regions in the early part of the last century." Elsewhere in his paper he lays great stress on the fact that these forms were unknown to "such keen field naturalists as Audubon and Wilson, [Nuttall.] Lawrence, Coues and Prentiss."

Having elsewhere replied¹ in considerable detail to Mr. Scott's paper, we will here merely state, (1) that the area where these birds have been found (except in the case of a very few migrants) was wholly outside of the regions studied by the above named "keen field naturalists," and that their ignorance of these birds does not imply their absence from the area where they have since been found in some numbers, and their probable recent origin; (2) that these birds do not present the stable character observed in mutants, which always breed true; (3) that they occur only where the breeding ranges of *Helminthophila chrysoptera* and *H. pinus* overlap, and are thus strictly comparable with the hybridity seen on a grand scale between *Colaptes cafer* and *C. auratus* over the extensive region where their breeding ranges overlap; (4) that Mr. Scott has not shown a very clear grasp of the facts in the case of these warblers, or of the real character of mutants; (5) that the hypothesis of hybridity, plus more or less tendency to dichromatism, satisfactorily accounts for *H. lawrencei* and *H. leucobronchialis* and their endless variants.—J. A. A.

Clark's 'Birds of the Southern Lesser Antilles.'—This paper, of over one hundred pages,² relates to Barbados, St. Vincent, the Grenadines, and Grenada. Twenty-five pages of introductory matter treat of the 'Literature,' 'Geology and Geography' (pp. 206-215), 'Meteorological and Geological Phenomena' (hurricanes and volcanic eruptions), 'Present Status of Bird Life,' 'Locally Extinct Species,' 'Introduced Species,' 'Exported

¹Science, N. S., Vol. XXII, No. 562, pp. 431-434, Oct. 6, 1905.

²Birds of the Southern Lesser Antilles. By Austin H. Clark. Proc. Boston Soc. Nat. Hist., Vol. XXXII, No. 7, pp. 203-312. Oct., 1905.

Species,' 'The Mongoose,' and 'The West Indian Avifauna' (pp. 221-228). The 'Annotated List' occupies pp. 228-302, and is followed by nominal lists of species known to breed in the different islands, and by a bibliography of nearly one hundred titles. The list numbers 168 species as of known occurrence, of which 11 are introduced; 5 others are given as of doubtful occurrence, and 3 as 'hypothetical.' Quite a number of the species admitted rest on single records.

The list is based primarily on observations and collections made by the author during a continuous residence of rather more than a year (August 3, 1902-September 22, 1904), and on the literature of the subject, which appears to have been very carefully examined, including such 16th and 17th century authors as Rochefort, Ligon, Dutertre, Labat, Hughes, and Sloane. *Coccyzus minor vincentis* is here described as new, and four others, based on the investigations here recorded, were described by the author in earlier papers, and are in part here redescribed. Besides the very extended remarks on the distribution and habits of the forms here enumerated, there are often critical remarks on their relationships and probable origin as birds of these islands. The work altogether shows careful research and is an important contribution to West Indian ornithology.—J. A. A.

Oberholser's 'A Monograph of the Genus *Dendrocincla* Gray.'¹—Of this difficult genus 18 forms are recognized, namely, 12 species and 6 additional subspecies. Two species and two subspecies are here described as new, and four names previously current are reduced to synonymy. Specimens of all except two were examined, including the types of seven of them. *Dendromanes* Sclater, proposed for *Dendrocincla anabatina*, is treated "as a simple synonym of *Dendrocincla*." There is a key to the species and subspecies, and the type locality, distribution, and synonymy of each are given.—J. A. A.

Beebe's 'The Ostriches and their Allies.'²—Apropos of the recent opening of the Ostrich House in the New York Zoölogical Park, Mr. C. William Beebe, Curator of Birds at the Park, has prepared an excellent popular account of 'The Ostriches and their Allies,' which is published in the Ninth Annual Report of the Society, and also separately.² It consists of Part I, a general account of the Apteryges, the Emeus, the Cassowaries, and the Ostriches, and Part II, their external structural adaptations to cursorial habits. The text is a well prepared popular account of these

¹A Monograph of the Genus *Dendrocincla* Gray. By Harry C. Oberholser. Proc. Acad. Nat. Sci. Philadelphia, 1904, pp. 447-463, June 19, 1904.

²The Ostriches and their Allies. By C. William Beebe, Curator of Birds. Ninth Ann. Rep. New York Zool. Soc., 1904, pp. 203-229. Also separate, 8vo, pp. 32, with 8 half-tone plates and 11 text illustrations.

birds, their modifications and adaptations; the illustrations, based on photographs, show the living birds, their feet, wings, and feathers. It is thus well adapted to its function of a manual of instruction for visitors to this portion of the exhibits at the New York Zoölogical Park.— J. A. A.

Beebe's 'Two Bird Lovers in Mexico.'¹— 'Two Bird-Lovers in Mexico' is a pleasantly written account of a winter trip across Mexico, from Vera Cruz to Manzanillo, made by the author and his wife during 1903-04. As much time was spent 'roughing it,' camping out with a guide and traveling with animals, their opportunities for studying the birds and animals of portions of the States of Colima and Jalisco could hardly have been more favorable, and the pages of this attractive book, as regards both illustrations and text, show the good use made of these unusual advantages. 'Two Bird-Lovers in Mexico' is thus a book for the general reader as well as the nature-lover and the naturalist. Says the author: "The entire trip was so novel, so absolutely devoid of unpleasant features, and on the whole so inexpensive, that it seemed to me that the knowledge of such an outing would tempt many lovers of Nature to this neighboring Republic." Mr. Beebe's book cannot fail to be such an incentive, and the chapter by Mrs. Beebe on 'How we did it' will be of great assistance to those who may wish to follow in their footsteps.

Besides the incidental and many quite extended notices of birds, mammals, reptiles, and insects contained in the three hundred and fifty pages or more of the general narrative, an annotated list of the birds and mammals observed is given in an appendix of twenty-five pages, with cross references to the general text² where they are further mentioned or more fully described. As the author is an enthusiastic and well trained observer, his narrative of experiences in the Mexican tropics is full of attractively presented information respecting the region visited and its inhabitants — human as well as animal and vegetable.— J. A. A.

Hantzsch's Birds of Iceland.³— This detailed summary of present knowledge of the ornithology of Iceland consists of two parts, the first being the generalities of the subject (pp. 1-90), and the second a systematic

¹Two Bird-Lovers in Mexico | By | C. William Beebe | Curator of Ornithology of the New York Zoölogical Park and Life | Member of the New York Zoölogical society; Member | of the Ornithologists' Union | Illustrated with Photographs | from Life by the Author. | [Vignette] Boston and New York | Houghton, Mifflin and Company | The Riverside Press, Cambridge | 1905 — 8vo, pp. xii+408, with 15 half-tone plates and 108 text cuts. \$3.00.

²Unfortunately the references to the later part of the book are quite often two pages out of the way, as if made from proof-sheets and the pagination later changed by carrying the folios two pages ahead.

³Beitrag zur Kenntniss | der | Vogelwelt Islands | Von Bernhard Hantzsch | Mit 26 Abbildungen und 1 Karte | Berlin | Verlag von R. Friedländer & Sohn | 1905 — 8vo, pp. vi+341, with 24 text cuts and 1 map. Price 12 marks.

account of the species (pp. 92-338). Part I consists of seven sections, comprising: (1) a historical résumé; (2) a list of the principal works and papers on Iceland birds; (3) an account of the author's travels in Iceland, and of bird protection; (4) the topography, and the physical and biological features of the island; (5) changes in the bird life of the island within historic times, including an account of the extinction of the Great Auk; (6) derivation of the Icelandic ornis; (7) the economic value of the birds to the inhabitants. Section 6 contains also a briefly annotated list (59 species) of the birds of the little island of Grimsey, off the north coast, and another (68 species) of those of the islet Vesmannýjar, off the south coast.

Part II begins with a list of the species authenticated as birds of Iceland, numbering 120, with brief annotations as to their relative abundance and manner of occurrence. The list also includes, but not numbered as a part of the list, 12 species as of casual or probable occurrence, and the extinct Great Auk. Each is treated, generally at some length, in the following 240 pages of the work, including references to previous records of the species as birds of Iceland, their vernacular names in various languages, their distribution, relative abundance, habits, uses, etc., together with, in many cases, measurements of Iceland specimens, and a statement of the color of bill, feet, and naked soft parts, taken from fresh specimens by the author. The work is thus not only the latest but a most comprehensive and useful treatise on the ornithology of Iceland. The illustrations (half-tone reproductions of photographs in the text) include views of the breeding places of a number of species, and the nest and eggs of *Megalestris skua*, etc., but relate mainly to the physiographic features of the island, and are thus, though rather poorly reproduced, of great assistance in giving a clear impression of the prevailing physical conditions in different parts of the island.—J. A. A.

Csörgey's Ornithological Fragments from the Manuscripts of Johann Salamon von Petényi.¹—Johann Salamon von Petényi (born 1799, died 1855) was one of the founders of systematic ornithology in Hungary, for many years custodian of the Hungarian National Museum, and a friend of C. L. Brehm, J. F. Naumann, E. Baldamus, and other eminent ornithologists of his time. He was engaged for many years in gathering material for a comprehensive work on Hungarian birds, but died before it was ready for publication, and discoveries of species new to the Hungarian ornis first made by him remained unpublished till their rediscovery later by other workers. The fragments of his manuscripts, rescued from oblivion, and here brought together and published half a century after

¹Ungarische Ornithologische Centrale | — | Ornithologische Fragmente | aus den Handschriften von | Johann Salamon Petényi | Deutsch bearbeitet | von | Titus Csörgey | Mit einer Einleitung | von | Otto Herman | [Vignette] Gera-Untermhaus | Druck und Verlag von Fr. Eugen Köhler | 1905 — 8vo, pp. 36+400, frontispiece, 6 colored plates, and 16 text cuts.

his death, show him to have been one of the leading ornithological students of his time, and even after a lapse of fifty years they have still value and interest as a contribution to Hungarian ornithology.

An introduction of nearly twenty pages by Otto Herman contains an interesting biographical sketch of Petényi, and the editor's preface adds many details respecting his ornithological work. From the latter it appears that as early as 1842 he had already reached the point of distinguishing climatic varieties as such. In the 'Fragmente' we have some account of less than half of the species of the Hungarian ornithos, and these accounts vary from rather brief and incomplete notices to elaborate monographs, as in the case of *Falco sacer*, which occupies over twenty pages, besides some dozen additional pages by the editor, on the status of *F. feldeggii*, which he considers as merely a subspecies of *F. sacer*. The illustrations, by the editor, though not numerous, are especially noteworthy, particularly for the naturalness of pose of the birds depicted, both in the text cuts and in the plates; in fact, more life-like or more pleasing bird pictures we have rarely seen.—J. A. A.

Harvie-Brown's 'Travels of a Naturalist in Northern Europe.'—

These two beautiful volumes¹ relate to travels made by the author some thirty to thirty-four years ago, in Norway, Archangel, and Petchora, but the narrative has lost little of interest through the long delay in making it public. It is in journalistic form, being the author's journals just as he "wrote them down at the close of each day," with no attempt to rewrite or clothe in new phraseology the original entries. And herein lies much of the charm and much of historical value.

The first trip was to Norway in 1871, the account of which occupies pp. 1-103, with an appendix of twenty pages giving an annotated list of the birds (101 species) observed. The second trip was to Archangel in 1872, recounted in pp. 127-182, with appendices (pp. 183-209) giving lists of the birds and eggs collected around Archangel, and of the rarer birds in the museum at Archangel. The third journey was to Petchora in 1875 (pp. 215-476), the account of which is followed by several appendices on the ornithological results of the expedition, with some account of the Samoyèdes. The author on the first two trips was accompanied by the late Edward R. Alston, and on the journey to the Petchora by the late Henry Seebohm, on which journey was based his well-known 'Siberia in Europe.'

The illustrations include two colored plates (eggs of Gray Plover and Little Stint), portraits of the author, of Prof. Robert Collett, E. R.

¹Travels of a Naturalist | in Northern Europe | Norway, 1871 | Archangel, 1872 | Petchora, 1875 | By | J. A. Harvie Brown, F. R. S. E., F. Z. S. | Member of the British Ornithologists' | Union, etc. | Joint Author of 'Fauna of the Moray Basin' and | 'A Vertebrate Fauna of Orkney'; | Author of 'A Vertebrate Fauna of the N. W. Highlands and Skye' | With coloured plates and other illustrations | and 4 maps | Vol. I [-II] | London: T. Fisher Unwin | Paternoster Square. MC MV | — 2 vols. Svo. Vol. I, pp. i-xiv, 1-260, 15 pll. and 2 maps. Vol. II, pp. i-viii, 261-541, 2 col. pll., 2 maps, 8 plain pll., and numerous text cuts.

Alston, Henry Seebohm, and others, several landscape views, nests of the Osprey, and various text illustrations of native implements, etc., and maps showing the routes traveled.

The daily narrative of the experiences of these travellers and collectors in these far northern and still little known regions, noting the progress of the season, the arrival and nesting of the birds, the characteristics of the country and the people, will be read with sympathetic interest by many beyond the wide circle of ornithologists to which it immediately appeals.—J. A. A.

Wytsman's 'Genera Avium.'—This important work¹, proposed in 1903 (see Auk, XXI, 1904, p. 312), seems now well under way, the first five parts having recently reached us for notice. Each part, restricted to a single family, is paged separately, and is practically complete in itself. Part I, by Ernst Hartert, treats of the Eurylæmidæ (pp. 8, 1 pl. col.); Part II, by P. Wytsman, of the Todidæ (pp. 4, 1 pl. col.); Parts III, IV, and V, by T. Salvadori, treat respectively of the Stringopidæ (pp. 2, 1 pl. col.), Nestoridæ (pp. 3, 1 pl. col.), and the Cacatuidæ (pp. 7, 1 pl. col.). The text consists of a brief general account of the family, in regard to its relationships and technical history, keys to the genera and species, with their principal synonymy and geographical distribution. The work will thus be of great convenience and value as a synopsis of the birds of the world. It is edited by P. Wytsman, is published in English, and the illustrations are by Keulemans. They give a full length figure of a characteristic species, with head, feet and other detail figures of a number of other species, thus far all in color, and of course well executed.—J. A. A.

'Ootheca Wooleyana.'—We are glad to note the appearance of Part III² of this well-known work, comprising 'Columbæ-Alcæ.' It is of course prepared on the well-considered lines of the previous parts.³ In addition to being a catalogue of the famous Wolley Collection, with authentic and detailed records of the specimens, it comprises also extended notes on the nesting habits and breeding ranges of the species, often to the extent of eight to a dozen pages to a species, with many important editorial additions. The entry numbers included in the present volume are 2798 to

¹Genera Avium. Edited by P. Wytsman, with Contributions by Messrs. P. L. Selater, R. Bowdler Sharpe, W. R. Ogilvie-Grant, E. Hartert, C. E. Hellmayr, T. Salvadori, etc. 4to, with colored plates. Printed and published by V. Vertemuil & L. Desmet, Brussels. Parts I-V, 1905. (Pt. I, 3/9; Pt. II, 3/1; Pt. III, 2/; Pt. IV, 2/11; Pt. V, 6/0.)

²Ootheca Wooleyana: An illustrated Catalogue [of] the Collection of Birds' Eggs [formed by the late] John Wolley, Jun., M. A., F. Z. S. [Edited from the original notes [by] Alfred Newton. — [Part III. Columbæ-Alcæ. — [London: [R. H. Porter, 7 Prince's Street, Cavendish Square. [M. C. M. V. [Price £2 2s, net. — 8vo, pp. i-iv, 1-384, pll. col. xiv-xxi.

³Part I, Accipitres (including Striges), 1864; Part II, Picariæ-Passerres, 1902.

4840, representing about 135 species. The eight colored plates relate exclusively to the eggs of the Great Auk, seven of which and a cast of another are figured, the accompanying text occupying pages 364-384. It is a matter for sincere congratulation that Mr. Wolley's valuable field notes and records are finally being made accessible, and given permanent form in a manner so attractive and under such competent editorship.—
J. A. A.

Economic Ornithology.—The ravages of the cotton boll weevil in Texas during the last few years and its prospective extension into other cotton-growing districts has led the Biological Survey to undertake investigations to determine what species of birds feed upon this weevil and to what extent they are likely to prove a check upon its increase. The preliminary results thus far reached have been summarized by Mr. Vernon Bailey, in a special report,¹ based on the examination of the stomachs of a large number of birds collected in and around the cotton fields, chiefly in the month of November, 1904, in southern Texas. The weevils were found in the stomachs of about a dozen species of birds, out of about 38 species examined, usually in small numbers, but in sufficient quantity to show that the efficient protection of insectivorous birds is of considerable importance to cotton-growers.

The economic relations of the Bob-white and other quails of the United States is the subject of a report by the late Dr. Judd, published also as a 'Bulletin' of the Biological Survey.² The eastern Bobwhite and its subspecies, here treated collectively, occupies, quite naturally, about two thirds of the report, the species of the Southwest the remaining third. There are two plates by Fuertes, one of 'Bobwhite in a potato field,' the other of the 'Gambel quail.' The first is colored and serves as an attractive frontispiece. Various text cuts illustrate the seeds of different weeds that are a pest to the farmer, tons of the seeds of which are destroyed annually by Bobwhite. This bird is considered (1) as an ally of the farmer, (2) as an asset of the farm, (3) as an article of food, (4) as an object of sport, (5) in relation to its esthetic value; several pages are also devoted to measures for its preservation and propagation, and about fifteen pages to a detailed account of its food habits. About 53 per cent of its food consists of seeds, chiefly those of plants injurious to agriculture. An additional 15 per cent is insects, which includes such noxious species as the potato beetle, chinch bug, weevils of various species, cutworms, grasshoppers, and many others. The remainder of its food consists mainly

¹Birds known to eat the Boll Weevil. By Vernon Bailey. Chief Field-Naturalist, Biological Survey. U. S. Department of Agriculture, Biological Survey, Bulletin No. 22, 8vo, pp. 16, 1905.

²The Bobwhite and other Quails of the United States in their Economic Relations By Sylvester D. Judd, Assistant, Biological Survey. U. S. Department of Agriculture, Bureau of Biological Survey, Bulletin No. 21. 8vo, pp. 66, 1905.

of wild berries and other wild small fruits. The California and other western species of quails have of course quite similar habits, but prove to be more or less destructive locally, from their great numbers, to certain farm crops, as grains and fruits, and especially grapes. They likewise destroy large quantities of weed seeds and injurious insects, but are, on the whole, considerably less insectivorous than the Bobwhites.

The Horned Larks in reference to their relation to agriculture have recently been studied by Mr. W. L. McAtee.¹ He finds that about 20 per cent. of their food consists of insects, ranging from less than two per cent. in the winter months to over 50 per cent. during some of the summer months. The rest is vegetable matter, consisting largely of the seeds of weeds and other useless plants, practically no cultivated fruit being taken, and the amount of grain that enters into their fare is a negligible quantity, although at some localities in California complaints have been made of their depredation upon newly-sown wheat. It is found, in fact, that the California horned larks differ markedly from those of other parts of the country in the high percentage of grain they consume, being three times that of the larks of other localities. On the whole, however, says the verdict: "So small in amount is the grain thus taken and over such restricted areas that, aside from the fact that at small expense all damage can be prevented, the loss bears no comparison to the benefits conferred. The horned lark by its services to agriculture earns a right to live, and deserves protection at the hands of man."—J. A. A.

CORRESPONDENCE.

On the Criticism of Heft III of 'Die Vögel der paläarktischen Fauna.'

TO THE EDITORS OF 'THE AUK':

Dear Sirs:—It has always been a pleasure to me to see that my ornithological writings have been looked upon favourably in America, and I am anxious that they are fully understood in your country, because I have a very high opinion of most of the ornithological work done in America. This is the reason why I wish to say a few words about the generally kind review of Part III of my book on the birds of the palaearctic fauna, in 'The Auk,' Vol. XXII, p. 428. The reviewer takes exception to my "conservatism" in respect to gen-

¹The Horned Larks in their Relations to Agriculture. By W. L. McAtee, Assistant, Biological Survey. U. S. Department of Agriculture, Biological Survey, Bull. No. 23. 8vo, pp. 37, 2 plates, and 13 text cuts.

era, and says that I have merged all the subgenera recognized by Hellmayr in his recent excellent monograph of the Paridæ in *Parus* and that "my treatment of this and allied families is far less satisfactory, and less consistent and rational, than the recent revision of these groups by Hellmayr." Needless to say I am not of the same opinion. The reviewer does not explain in which way my treatment is inferior to that of Hellmayr. The one point he objects to is, that I have no use for subgenera. This, however, is a matter of opinion, and the omission of subgenera does not make a work inferior. In my opinion subgenera are an unnecessary impediment. If a number of species is to be grouped into various sections, this is better done under nameless headings, such as "Blue Tits," "Grey Tits" etc., or A, B, C but if a name is given to these sections — which of course have not generic value, or else they would be recognized as genera — it leads to some persons adopting these names, others not, and some even using both names! This inconsistent treatment may be seen every day. Every student of palæarctic Paridæ must come to the conclusion, that the genus *Parus*, as limited by me, cannot be split into full genera: nevertheless a "subgenus" *Cyanistes* (among others) is recognized by some authors. What is the result? Most authors call the "Blue Titmouse," the type of the "subgenus" *Cyanistes* as usual *Parus cæruleus*, others make use of the subgeneric name and call it *Cyanistes cæruleus*, others again call it *Parus (Cyanistes) cæruleus*. All this is avoided by not giving a name to the so-called subgenera, regarding them merely as sections, tribes or subdivisions and calling them group A, B, C, etc., or the Black-and-white group, group with yellow or without yellow, etc. I fail to see entirely for what purpose subgenera are recognized and named, if no use is made of their names; on the other hand it is not scientific to treat them as genera, because, as in the present case, they cannot be separated by any constant characters, and I object to using both names, i. e. that of the genus and subgenus, because it makes our nomenclatorial apparatus unnecessarily cumbersome. Ergo: my most decided opinion is that "subgenera" are unnecessary and undesirable.

Except in the absence of subgenera my work differs from that of Mr. Hellmayr in the following points: I have combined still more allied forms as subspecies, added some formerly unknown forms and corrected a few errors. I do not deny my very strong tendency to combine allied forms as subspecies. My reviewer says that I have done this "sometimes apparently without satisfactory reasons therefor, as where *Parus sclateri* of Mexico is made a subspecies of *Parus palustris*, although separated geographically by thousands of miles. . . ." This treatment is, in my opinion, only apparently, but not really "unsatisfactory." My critic has never seen *Parus dejeani* nor *Parus hypermelæna*, or he might more likely have said that they were indistinguishable from *Parus sclateri*, and *P. dejeani* and *hypermelæna* are in my opinion connected by intermediate forms with *palustris*, and therefore subspecies. All this I have carefully explained in my book. These are difficult forms and difficult questions, to the study of which I have devoted the best part of a winter, with a material never seen before by one

man at the same time, and not easily brought together again, since many museums and friends sent me whole collections and single specimens for study, in addition to the wonderful material in the Tring-Museum, the results of many years of labour and expense. I do not think that such intricate questions can be criticized and declared to be "apparently unsatisfactory," unless the critic himself has devoted months of study to the subject.

Whether my work is inferior to that of my friend Hellmayr will soon become apparent, because the latter author will before long publish a new review of the *Paridae* of the world, and I am in the happy position to predict that Mr. Hellmayr will adopt practically all my alterations. In fact I have discussed many questions with him and we have finally agreed in all of them.

I have of course no objection to my kind critic's different views on certain points—in fact science is often benefited by the ventilation of various views—but I do object to the statement that there are "certain eccentricities" in my book. It is quite possible and even probable that certain of my conclusions are erroneous, for every human being makes mistakes sometimes, but my conclusions are not jumped at without critical studies, they are not combinations of "happy ideas" or the dangerous outbursts of a "brilliant mind"—but they are the logical results of careful and painstaking investigations. They may be, as I have said, erroneous in certain cases, but they are not "eccentricities," and a perusal of my book should reveal this to every ornithologist.

ERNST HARTERT.

Subgenera, and Other Matters.

WHILE Dr. Hartert is not alone in considering that subgenera "are unnecessary and undesirable," sympathizers with this view, taking naturalists at large, are apparently few and far between, judging by their works. In faunistic papers and in ordinary references to species, subgenera are preferably ignored, even by those who believe they subserve a useful purpose. In works of a classificatory character, as monographs, manuals, and systematic treatises on the birds of a large area or of particular countries, they should be no more omitted than the higher groups, since their use in the case of a large genus serves to indicate the relative degree of relationship of its different members.

To subdivide such genera into minor groups, and label them A, B, C, etc., or by some non-technical designation, as 'Blue' or 'Green,' in lieu of giving them a name by which they can be easily referred to as groups, only half meets the requirements of the case; it is only an ineffectual attempt to 'beat the devil round the bush.'

There is, and doubtless always will be, great diversity of opinion as to the proper limits of genera. Dr. Hartert, for example, is exceedingly con-

servative, and is satisfied often to combine into one genus a number of groups that many, possibly most, other ornithologists would keep apart as good genera; and even in other less heterogeneous groups, they would sometimes consider it desirable in classification to recognize certain subdivisions by name as subgenera. Even to drop subgeneric names from species designations would come far from bringing nomenclature to the standard adopted in 'Die Vögel der paläarktischen Fauna.'

As Dr. Hartert admits his "very strong tendency to combine allied forms as subspecies," it is perhaps not fair to criticise his conclusions without equal opportunity to go over the ground; yet one's experience in similar lines of research is apt to give an impression of the probabilities in such matters.

Perhaps the term "eccentricities" is rather too severe to apply to any features of the great work now under mention. But there is one point that, to say the least, seems a little extraordinary, namely, the disregard of the rule adopted by all codes, from the first 'B. A. Code' to date, that adjectival specific names must agree in gender with the generic name with which they are associated. For one author to rebel against such a general consensus of opinion, even on the plea of conserving stability in nomenclature, is to introduce a jarring element not at all conducive to either harmony or uniformity. From Linné down to the last International Code, generic names have been construed as substantives in the nominative singular, with which it has been universally ruled that adjectival specific names must agree in gender. Dr. Hartert's rebellion against this rule may be considered as approaching 'eccentricity'; at least this is one of the points I had in mind in using this, perhaps rather unfortunate, term.

Closely akin to this is the retention of names etymologically the same, if differing in orthography by a single letter, dependent even upon gender. But, 'more's the pity,' my friend Hartert is not the only aggressor in this matter, which is likely to become, or perhaps is already, the most serious bone of contention in nomenclatorial questions. We had hoped for his influence on the side of stability, and therefore feel deeply grieved that he should have espoused a principle, which, if even partially adopted — for we cannot expect a general stampede to an innovation so subversive of long accepted rules of nomenclature — will do more to upset stability than any other conceivable practice.

Again, since the promulgation of the British Association Code of Nomenclature in 1846, Brisson's genera have been almost universally accepted as tenable. Possibly a few authors during the last fifty years have declined to recognize them, but they have been very few in comparison with those who have been willing to follow in this matter the ruling of the 'B. A. Code.' When therefore the author of 'Die Vögel der paläarktischen Fauna' declines to accept Brisson's genera, and makes bold to state that in his opinion they are not genera at all, such action seems to come very near the border line of 'eccentricity.'

For more than half a century zoölogists have recognized the importance

of mutual agreement in respect to nomenclatorial rules, and repeated efforts have been made to prepare codes that should be so reasonable in their provisions as to meet the approval of at least the majority of zoölogists. The most important move in this direction was the appointment, some years since, by the International Zoölogical Congress of a representative committee to study the already existing codes and, on the basis of this examination, to formulate a code of rules that should meet as nearly as possible, in the estimation of the committee, the requirements of modern zoölogical nomenclature, this code to receive the endorsement of the International Zoölogical Congress, and thus carry with it the influence and approval of a representative international body of zoölogists. While such a code, of course, would not be mandatory, the solicitude of all working zoölogists to secure uniformity of usage in matters of nomenclature would naturally tend to the waiving of personal preferences and prejudices for the sake of stability and uniformity in nomenclature.

A code of nomenclatorial rules must necessarily be to some degree arbitrary in its fundamental principles, and a compromise in respect to many important details. Most of us have strong opinions and preferences on many points, but in case they should run counter to the rulings of a representative international committee one should consider that loyalty to the best interest of science in so important a matter as uniformity and stability in nomenclature would render it laudable for one to contribute his mite in securing such desirable ends by waiving his preferences and accepting what such a body of naturalists had decided was for the general good. To do otherwise would be to assume the rôle of an obstructionist, whose 'eccentricities' in nomenclatorial matters it would be proper for other zoölogists to ignore.

Thus it is a matter of serious regret that Dr. Sharpe, in his 'Hand-List of the Genera and Species of Birds,' should have persisted in taking Linnæus at 1766 instead of 1758 as the starting point of binomial nomenclature, thus putting the work seriously out of touch with present tendencies and usage, to the inconvenience of the great majority of workers in the same field. The placing, in the same work, of species and subspecies, on the same basis as regards nomenclature is also a most inconvenient and unscientific archaism, not to say 'eccentricity,' greatly to be regretted. It is individualism of this sort that is retarding uniformity and stability in nomenclature.

For many years we have been an admirer of Dr. Hartert's careful work and advanced methods, and have often had the pleasure, as a reviewer, of commending his works and papers. Some twenty years ago the A. O. U. published a 'Code of Nomenclature,' which introduced a number of innovations, among them the adoption of the 10th edition of the 'Systema Naturæ Linneï' as the starting point of binomial nomenclature, the adoption of trinomials for subspecies, and the non-emendation of names. They each encountered for a time much opposition, but in recent years all have found their way into nearly all of the modern codes of nomenclature, in-

cluding the latest draft of the International Code. Among the first European ornithologists to accept the more important of these innovations, and to show a just appreciation of the principle of subspecies and trinomialism, was the author of 'Die Vögel der paläarktischen Fauna'; and it is therefore all the more to be regretted that he has gone so far beyond the original intention of the non-emendation principle as to make it a menace rather than an aid to stability in nomenclature.

J. A. ALLEN.

NOTES AND NEWS.

AT THE last Congress of the A. O. U., held in New York City November 13-16, 1905, the Union authorized the Committee on the Nomenclature and Classification of North American Birds to prepare a new edition of the A. O. U. Check-List, with a view to its early publication. As the nomenclature of the Check-List was based on the A. O. U. Code, published twenty years ago, it was also deemed advisable to make a critical examination of the Code, with a view to amending some of its provisions, to make it meet more fully the present requirements of zoölogical nomenclature. In order to make such a revision available for use in the preparation of the new edition of the Check-List, a special committee was appointed to take up the matter with as little delay as possible, its report to be submitted to a meeting of the Council to be called specially to act upon it. The Committee appointed on the revision of the Code consists of the following: J. A. Allen (chairman), Theodore Gill, Henry W. Henshaw, Harry C. Oberholser, Wilfrid H. Osgood, Charles W. Richmond, Witmer Stone. Within a few days after the adjournment of the Congress the Committee on the Code was called to meet in Washington on Dec. 11, 1905. A four day's session was held, beginning on this date, at which all of the members were present. Several important and a considerable number of minor changes were adopted, nearly all unanimously and the others with only one or two (in one case only) dissenting votes. It is expected that a special meeting of the Council will be held in Washington about the middle of January, to receive and act upon the report of the Code Committee. A meeting of the Nomenclature Committee will immediately follow, to begin work upon the new edition of the Check-List.

In this connection it may be safe to premise that probably the forthcoming third edition of the 'Check-List' will be quite different from either of its predecessors. In these days of rapid progress in zoölogical research, twenty years is a long period, and while the classification adopted in the

present Check-List seemed fairly satisfactory in 1886, it long since ceased to represent modern views respecting avian taxonomy. The present, therefore, seems a favorable opportunity to revise the classification of the higher groups, and thus bring the Check-List once more into harmony with present knowledge of the subject. The geographical ranges of the species and subspecies will be most carefully revised, probably by a special sub-committee, and thus brought down to date. There will doubtless be also a few changes in generic names, some of which have been for some time impending.

THE FIRST annual meeting of the National Association of Audubon Societies was held at the American Museum of Natural History in New York City on October 31, 1905. Twenty-seven members were present at the business meeting, held in the morning, representing Massachusetts, Rhode Island, Connecticut, New York, New Jersey, North Carolina, Oregon, and the District of Columbia. The afternoon session, which was open to the public, was attended by several hundred persons interested in the work of bird protection. The Treasurer's report showed the Association to be in a prosperous condition, with a bright outlook for the future. Six of the directors, whose terms had expired were reelected for the term of five years, namely: George Bird Grinnell, New York; Arthur H. Norton, Maine; H. P. Attwater, Texas; Walter J. Blakely, Missouri; Mrs. Mabel Osgood Wright, Connecticut; and Mrs. Kingsmill Marrs, Florida. William L. Finley, Oregon, was elected to fill the unexpired term of Isaac N. Field, deceased. The President's report was given in abstract and ordered printed in 'Bird-Lore,' and also separately for general distribution.

At the afternoon session the principal topic of discussion was cats, in their relation to bird protection. The principal speakers were Dr. George W. Field, President of the Massachusetts Fish and Game Commission; Dr. T. S. Palmer, Biological Survey, Washington; Rev. William Lord, Massachusetts, and Mr. Frank M. Chapman. It seemed to be agreed that if cats could be kept at home, and their owners made responsible for them, as in the case of dogs and other domestic animals, the lives of multitudes of wild birds would be annually saved. At the close of the discussion the following resolution was adopted:

"Resolved, That in the interests of humanity and bird protection the National Association of Audubon Societies endorses the movement to make the owners of cats responsible for their acts and welfare."

At the afternoon session Mr. William L. Finley gave an account of his experiences among the large colonies of water-birds which breed in south-eastern Oregon, illustrated with lantern-slides; and Mr. Frank M. Chapman gave an illustrated talk on English bird life, based on his experiences of the past summer.

The Annual Report of the President of the Association, Mr. William Dutcher, has been published in the November-December, 1905, number of 'Bird-Lore' (Vol. VII, pp. 295-350), and occupies fifty-six pages, including a number of pertinent half-tone illustrations. As in Mr. Dutcher's

former annual reports, for sometime published in 'The Auk,' it contains much matter of permanent value as ornithological literature, aside from that relating more directly to the history of bird protection. It consists, as usual, of (1) a history of the year's work, detailing the principal results in the matters of legislation, the securing of 'reservations' for breeding bird colonies, the protection of birds through the employment of wardens, coöperation secured with foreign countries, etc.; (2) suggestions for future work; (3) abstracts from State reports; (4) list of members and contributors; (5) the Treasurer's report. It is sufficient to say here that the success that has in years past attended Mr. Dutcher's enthusiastic and well-considered efforts for bird protection has in no way declined, but with the greater power and influence and the increased means that have come to his aid through the organization and incorporation of a National Association of Audubon Societies, the work has assumed larger proportions, and become more far-reaching and aggressive. It is pleasant to note that the membership of the Association is rapidly increasing, and with it the funds available for carrying on the work, the latter having increased 250 per cent. during 1905. His report should have a wide circulation, not only among ornithologists but among philanthropists interested in whatever pertains to the preservation of wild creatures, for either their present economic and esthetic importance, or for the benefit of future generations.

MANY of the Members of the A. O. U. who attended the recent Congress in New York City, had at the close of the session a most enjoyable day at the New York Zoölogical Park, where they were cordially welcomed and entertained by Director Hornaday and his Curator of Birds, Mr. Beebe. The ornithological portion of the collections, in common with the wonderful development of this exceptionally flourishing Zoölogical Garden, has made rapid progress during the few years of its existence, in its equipment of buildings and cages as well as in the growth of the collections. The new Bird House, L-shaped, with two large exhibition halls, became available last July. One of these large halls, the Parrot Room, is 65 feet long by 50 feet wide, with a height to the peak of the roof of 36 feet. The roof being of glass insures plenty of light, and there is ample provision for fresh air. Both halls are lined with large cages, in place of the many small ones usually seen in aviaries, the use of large cases allowing several species to be exhibited together, and proving a satisfactory arrangement.

Besides the Great Flying Cage, briefly described in this journal some years ago (*Auk*, XVI, 1899, p. 96), there are nineteen large out-door enclosures for the hardier species. In the grounds devoted to birds there are, in all some eighty cages, for the most part already well stocked with birds, of great variety and gathered from all parts of the world, American species, however, very properly predominating. Many of the native wild species of the vicinity, having learned that they can here find both safety and plenty of food, have also become voluntary residents of the Park,

contributing thereby greatly to the pleasure of the many bird-lovers who visit the Park for purposes of study.

A paper by Curator Beebe, giving some account of the birds in the Park aviaries, their peculiarities and behavior, and various interesting experiences in their management, which he kindly presented at the A. O. U. Congress, was a good introduction for the members to their subsequent visit, and contributed to the interest with which they later made their acquaintance with the birds themselves in the Garden.

JOHN W. AUDUBON'S 'Western Journal: 1849-1850,' of his notable overland journey from Texas through Mexico and Arizona to California, is being brought out in one volume, 8vo, with map, portrait, and plates, under the competent editorship of Prof. Frank H. Hodder of the University of Kansas, by the Arthur H. Clark Company of Cleveland, Ohio. It will also contain a biographical memoir by his daughter, Miss Maria R. Audubon, who has been able to avail herself of a large amount of material not accessible to any other biographer. The plates illustrating the 'Journal' are from the author's original sketches. Price, \$3.00 net.

A NEW work on oölogy by George Krause, entitled 'Oologia universalis palaearectica,' has been announced by Fritz Lehmann of Stuttgart, to appear in 150 Parts, quarto, each part to consist of two or three plates with the text, the publication to be completed if possible in two years. The subscription price is 1s. 6d. per part. The text will be printed in both English and German, so as to give the work greater availability. A plate will be given, wherever possible, for each species, so as to present illustrations of all the principal variations, as shown in the sample plate of the eggs of the European Black-headed Gull (*Larus ridibundus*), where sixteen very distinct color phases are depicted. The author, who is an oölogist of distinction, is also the artist and designer of the plates, and thus will be able to bring to the work the critical eye of the expert. The text will be 'schematic' and brief, giving in a few lines the breeding range, time of hatching, size and number of the eggs, etc., leaving the excellent plates to tell the tale of the color variations.

DURING the last three years the American Museum of Natural History has employed Mr. J. H. Batty to collect for it natural history material in Mexico. His collections consist mainly of birds and mammals, but include many reptiles, some insects and crustaceans, and about 600 photographic negatives. The mammals include large series of the larger species, particularly of carnivores and deer, the felines, from ocelots to jaguars, being especially well represented. The birds number nearly 5000 skins besides several hundreds nests and eggs. The areas quite exhaustively worked include northwestern Durango, southern Sinaloa, and the States of Jalisco and Colima. A report on the southern Sinaloa collection of birds has already been prepared and published in the Museum 'Bulletin,' and an account of the Durango birds is ready for publication, both being by Mr. Waldron DeWitt Miller, assistant in ornithology at the Museum.